

Draft Biological Evaluation

For Revised Land and Resource Management Plan

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for:

Shoshone National Forest
Rocky Mountain Region

Date Completed _____

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1.0 Introduction

This biological evaluation (BE) discloses the potential influences of the Proposed Draft Plan and alternatives, Shoshone National Forest (the Shoshone), on Forest Service Rocky Mountain Region (R2) sensitive species. The list of R2 regional forester sensitive species was updated on May 25, 2011.

The Forest Service Manual (FSM) directs the Forest Service to develop and implement management practices to ensure that sensitive species do not become threatened or endangered because of Forest Service actions (FSM 2670.22). Sensitive species are those plant and animal species identified by a regional forester for which population viability is a concern as evidenced by (a) significant current or predicted downward trends in population numbers or density or (b) significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution (FSM 2670.5).

The FSM directs the Forest Service to prepare biological evaluations for projects, as part of the National Environmental Policy Act of 1969, to determine the potential effects from those projects on sensitive species and to ensure that Forest Service actions do not contribute to loss of viability of threatened, endangered, proposed, or sensitive plant and animal species, or contribute to a trend toward federal listing of any species under the Endangered Species Act (FSM 2672.41 and 2670.32). A biological evaluation is defined as a documented review of Forest Service programs or activities in sufficient detail to determine how an action or proposed action may affect any sensitive species (FSM 2670.5). A separate biological assessment was prepared to address effects on threatened, endangered and proposed species (FSM 2670.5).

A review of information regarding the distribution of habitats on the Shoshone National Forest, observations of species on the Forest, known areas of occupancy, and fieldwork over the past several years has been incorporated. Sources of information include Forest Service records and files, the Wyoming Natural Diversity Database (WYNDD), Wyoming Game and Fish Department (WFGD) and other Federal wildlife agency information, and published research.

2.0 Project Area

The project area is the Shoshone National Forest boundary; located in the middle Rocky Mountains in northwestern Wyoming (see Figure BE- 1).

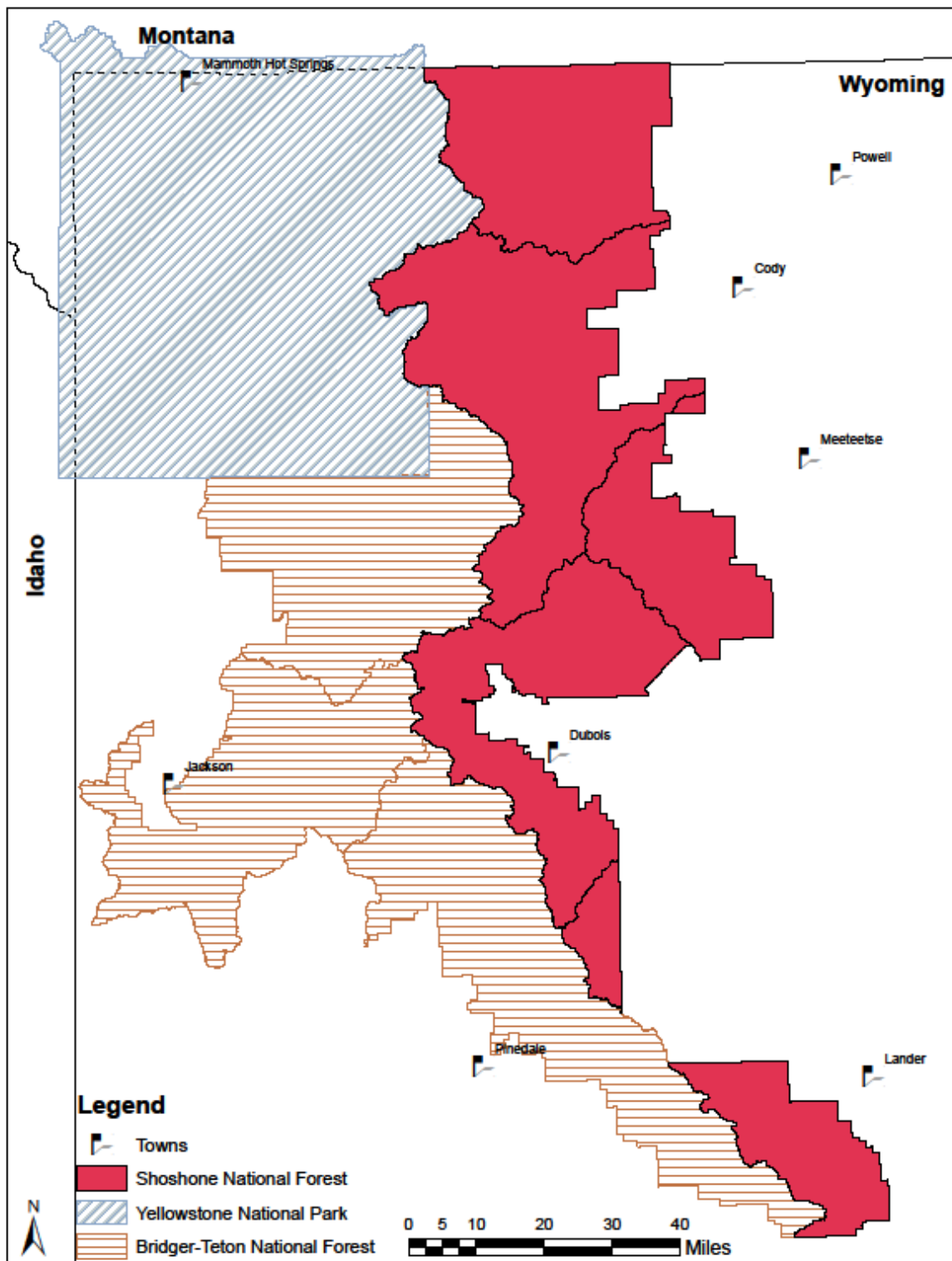


Figure BE- 1 Shoshone National Forest, planning area boundary

The Shoshone consists of 2.4 million acres in Fremont, Hot Springs, Park, Sublette, and Teton Counties. The Shoshone National Forest is part of the Greater Yellowstone Area. The Greater

Yellowstone Area consists of about 13 million acres of public lands managed by the USDA Forest Service, National Park Service, and U.S. Fish and Wildlife Service. It includes six national forests (Beaverhead-Deerlodge, Bridger-Teton, Caribou-Targhee, Custer, Gallatin, and Shoshone), three national parks (Grand Teton, Yellowstone, and John D. Rockefeller, Jr. Memorial Parkway), and two national wildlife refuges (National Elk Refuge and Red Rock Lakes). The Greater Yellowstone Area is one of the last remaining large, nearly intact ecosystems in the northern temperate zone.

On the Shoshone, terrain varies widely from sagebrush flats to rugged mountains because the Shoshone is situated on the western edge of the Great Plains and the eastern side of the Continental Divide. Elevations on the Shoshone range from 4,600 feet at the mouth of Clarks Fork Canyon to 13,804 feet on Gannett Peak, Wyoming's highest point. The higher mountains are snow-clad most of the year with immense areas of exposed rock interspersed with meadows and forests.

Most of the Shoshone is within the upper Missouri River Basin, subdivided by the Wind/Big Horn and Clarks Fork of the Yellowstone River basins. The southern tip of the Shoshone is in the Sweetwater drainage, which flows into the Platte River system. Principal rivers within the Shoshone boundary are the Clarks Fork of the Yellowstone River, North and South Forks of the Shoshone River, and the Greybull, Wind/Big Horn, and Popo Agie Rivers.

Annual precipitation varies with topography and elevation, ranging from 15 to 70 inches. Higher elevations receive from 30 to 40 percent of their annual precipitation during the winter in the form of snow, roughly 40 percent as rain and snow in the spring, and 20 to 30 percent as rain in the summer and fall.

3.0 Description of Proposal

The Shoshone National Forest Land and Resource Management Plan (1986) is being revised. Since 1986, the Forest Plan has been amended 14 times. Land use plans provide broad guidance and information needed for project and activity decision-making. This Plan will guide relevant resource management programs, practices, uses, and protection measures. The associated environmental impact statement (EIS) examines potential environmental effects that could occur as a result of implementing projects associated with the land use plan.

This integrated plan for long-term management of the Shoshone:

- Establishes Forest-wide multiple-use goals and objectives.
- Establishes Forest-wide standards and guidelines applying to future activities and resource integration requirements.
- Establishes management area direction (management area prescriptions) applying to future activities in a management area.
- Meets the requirements for additional planning for special areas unless inconsistent with special area authorities.
- Designates land as suited or not suited for timber production and other resource management activities such as rangeland and recreation management.
- Establishes monitoring and evaluation requirements.
- Recommends the establishment of wilderness, wild and scenic rivers, and other special designations to Congress, as appropriate.

4.0 Alternatives

Six revision or issue topics drove the development of the six alternatives.

Issue 1. Recreation Uses and Opportunities.

Issue 2. Special Areas and Designations.

Issue 3. Vegetation Management.

Issue 4. Wildlife Habitat Management.

Issue 5. Minerals.

Issue 6. Commercial Livestock Grazing.

The six alternatives are summarized below.

Alternative A (No Action): Alternative A is the continuation of present management under the existing 1986 Land and Resource Management Plan and its amendments. It meets requirements of the National Environmental Policy Act that a no-action alternative be considered. “No action” means that current management practices based on existing land use plans and other management decision documents would continue.

Alternative B: Preliminary proposed action. Alternative B provides a balanced response to the issues raised during revision, continues management that is working, and adjusts, to the extent possible, to be responsive to the issues raised by the public.

Alternative C: High wilderness and back country non-motorized recreation. Alternative C demonstrates the most amount of land allocated for wilderness, with no motorized use in remaining inventoried roadless areas.

Alternative D: Back country and non-motorized emphasis. Alternative D provides back country and non-motorized uses, while maintaining moderate to low levels of commodity production. This alternative also addresses issues raised by the public and conservation groups.

Alternative E: Commodity and motorized use emphasis. Alternative E provides commodity production and motorized use while addressing issues shared by the public, local industry, and motorized user groups

Alternative F: High commodity and motorized use emphasis. Alternative F demonstrates the highest level of commodity production and motorized use possible within parameters, such as designated wilderness, the grizzly bear primary conservation area, etc.

The differences among the six alternatives and their potential to sensitive species can be analyzed by the different management areas with which they are associated. Management areas outline uses and activities that may occur within them. All Shoshone National Forest System lands have been allocated to one of 25 management areas that range from areas where more wilderness and back country non-motorized is emphasized to areas that are more intensely managed. In general, those alternatives that allow a higher level of management intensity may require a higher level of management attention to the protection and maintenance of habitats for species that are sensitive to habitat alteration and/or human disturbances. A summary of the differences in management areas by alternative is displayed in Table BE- 1.

Table BE- 1 Acres of management areas by alternative

Mgmt Area	Description	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F
1.1	Wilderness	1,358,592	1,358,592	1,358,592	1,358,592	11,358,592	1,358,592
1.1A	Glacier Addition	6,563 6,563	6,563 6,563	6,563 6,563	6,563 6,563	6,563 6,563	6,563 6,563
1.2	Recmnd Wilderness			584,734	165,587		
1.2A	Recmnd High Lakes Wldrnss			15,224			
1.2B	Recmnd Dunoir Wldrnss			28,879	28,879		
1.3	Back Cntry NonMotorized	455,554	358,127	106,890	395,123	327,549	203,587
1.5A	Clarks Fork Wild River	6,924	6,924	3,350	6,924	6,924	6,924
1.6A	High Lakes WSA	15,224	15,224		15,224	15,224	15,224
1.6B	Dunoir SMU	28,879	28,879			28,879	28,879
2.2A	Line Creek RNA	1,278	1,278	186	1,278	1,278	1,278
2.3	Proposed RNA	1,386	12,127	4,298	15,201		
3.1A	Swamp Lake SIA	581	581	581	581	581	581
3.1B	Prpsd Little Popo Agie SIA		1,714	1,714	31,714		
3.1C	Prpsd Sawtooth Peatbeds SIA		648		648		
3.3A	Back Cntry Motorized	185,936	64,243	4,948	8,333	90,500	175,296
3.3B	Back Cntry Winter Motorized		86,413	3,157	75,068	43,485	5
3.3C	Back Cntry Summer Motorized		72,735	4,936	11,500	98,030	4,563
3.5	Back Cntry Rec & Restoration		66,427				
4.2	Travel Corridor	164,447	100,883	82,588	100,883	103,422	103,901
4.3	Back Cntry Access Corridor		13,982	5,120	13,947	8,775	3,349

Table BE- 1 Acres of management areas by alternative

Mgmt Area	Description	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F
4.5A	Prpsd Kirwin SIA	481	481	481	481	481	
5.1	Mngd Forests & Rangelands	157,215	173,116	72,298	168,350	253,717	528,146
5.2	Public Water Supply		12,868	6,841	7,953	12,868	
5.4	Mngd Big Game Crucial Winter Rng	54,972	55,079	145,505	54,057	80,016	
8.2	Ski-based Resort		1,145	1,145	1,145	1,145	1,145
	Totals	2,438,030	2,438,029	2,438,029	2,438,029	2,438,029	2,438,029

Alternative A management areas assigned to the nearest equivalent revised plan management area)

5.0 Sensitive Species Considered

Sensitive species that occur, or could occur, in the planning area are displayed in Table BE- 2.

Table BE- 2 Rocky Mountain Region sensitive species on the Shoshone National Forest (as of March 2012)

Common name(s)	Global/state ranking ¹¹	Habitat
Fish species		
Yellowstone cutthroat trout	G4/T2/S2	Streams Lakes
Mountain sucker	G5/S5	Streams
Lake chub	G5/S5	Rivers Lakes
Mammal species		
American marten <i>Martes Americana</i>	G5/S3	Subalpine spruce/fir forests, alpine tundra, montane forests

¹ Conservation status ranks estimate a species risk of elimination. Status ranks are based on a 1 to 5 scale, 1 denoting a species is critically impaired and 5 denoting a species is secure. Species status is assessed at three geographic scales: global (G), national (N), and state/province (S). The overall status of a species is denoted by its G-rank, while its condition in a particular country is denoted by its N-rank, and its condition in a particular state/province is denoted by its S-rank. State rank is assigned by Wyoming Natural Diversity Database biologists and denotes a species probability of elimination in Wyoming. Subspecies, varieties, or any other designation below the level of a global ranked species, receive a T-rank that denotes their conservation status. A species may receive a B- or N-rank that refers to the conservation status of the breeding (B) or non-breeding (N) population in a particular nation or state/province. (NatureServe, February 2012, Wyoming Natural Diversity Database February 2012)

Table BE- 2 Rocky Mountain Region sensitive species on the Shoshone National Forest (as of March 2012)

Common name(s)	Global/state ranking ¹¹	Habitat
Fringed myotis <i>Myotis thysanodes pahasapensis</i>	G4/G5/S2	Dry habitats where open grasslands and shrublands are interspersed with mature xeric forests creating ample edges
Hoary bat <i>Lasiurus cinereus cinereus</i>	G4/S4	Aspen and pine forests
North American wolverine <i>Gulo gulo</i>	G4/S2	Rare; Boreal spruce/fir forests and tundra. Subalpine coniferous forest
River otter <i>Lontra Canadensis</i>	G5/S3	Streams, Lakes, Aquatic habitats
Rocky Mountain bighorn sheep <i>Ovis canadensis canadensis</i>	G4/S3	Alpine, Cliffs, Meadows
Spotted bat <i>Euderma maculatum</i>	G4/S3	Coniferous forest Cliffs over perennial water
Townsend's big-eared bat <i>Corynorhinus townsendii</i>	G4/S2	Caves and mines in deciduous forests
Water vole <i>Microtus richardsoni</i>	G5/S2	Subalpine and alpine meadow water courses
Bird species		
American peregrine falcon <i>Falco peregrinus anatum</i>	G4/T4/S2	Breeds on cliffs, often in association with riparian areas.
Bald eagle <i>Haliaeetus leucocephalus</i>	G4/S3B/S5N	Large riverine, Forested stands around aquatic settings
Black-backed woodpecker <i>Picoides arcticus</i>	G5/S1	Mature spruce/fir forest
Boreal owl <i>Aegolius funereus</i>	G5/S2	Mature subalpine spruce/fir forests
Brewer's sparrow <i>Spizella breweri</i>	G5/S5	Mountain foothills and basin-prairie sagebrush
Grasshopper sparrow <i>Ammodramus savannarum</i>	G5/S4	Basin-prairie shrublands
Greater sage-grouse <i>Centrocercus urophasianus</i>	G4/S4	Grasslands with sagebrush
Ferruginous hawk <i>Buteo regalis</i>	G4/S4B/S5N	Open prairie
Harlequin duck <i>Histrionicus histrionicus</i>	G4/S1B	Swift forest rivers and streams
Loggerhead shrike <i>Lanius ludovicianus</i>	G4/S3	Open sagebrush, grasslands
Northern goshawk <i>Accipiter gentilis atricapillus</i>	G5/S3	Mature montane coniferous and mixed forests
Northern harrier <i>Circus cyaneus</i>	G4/S4B/S5N	Marshes, meadows, grasslands

Table BE- 2 Rocky Mountain Region sensitive species on the Shoshone National Forest (as of March 2012)

Common name(s)	Global/state ranking ¹¹	Habitat
Olive-sided flycatcher <i>Contopus cooperi</i>	G4/S4B	Coniferous forest
Sage sparrow <i>Amphispiza belli</i>	G5/S3	Basin-prairie sagebrush
Short-eared owl <i>Asio flammeus</i>	G5/S2	Basin-prairie shrublands, grasslands, marshes
Trumpeter swan <i>Cygnus buccinator</i>	G4/S2	Shallow lakes, large ponds
Amphibian species		
Boreal toad <i>Bufo boreas boreas</i>	G4T4/S1	Marshes, wet meadows, streams, ponds, lakes
Columbia spotted frog <i>Rana luteiventris</i>	G4/S3	Grass and sedge edges of streams, lakes, ponds, springs, and marshes
Northern leopard frog <i>Rana pipiens</i>	G5/S3	Grass and sedge edges of streams, lakes, ponds, springs, and marshes

6.0 Sensitive Species Evaluations and Analysis of Effects

All sensitive species known to occur or suspected to have habitat on the Shoshone National Forest are evaluated below. Sensitive species are analyzed to determine if they could be affected by the proposed action, no action, and alternatives to the proposed action. Species are grouped according to the habitats in which they occur, and by class (mammals, birds, amphibians, and fish). Effects from the proposed action, no action, and alternatives are discussed at the end of each section. All effects analyses are predicated on the assumption that proper administration and compliance is used in implementing the management activities associated with the Revised Forest Plan.

This information is based on the most current scientific information available including species assessments, monitoring plans, conservation assessments and plans, and recovery plans.

As a result of analysis, one of the following determinations is made for each species: “no impact,” “beneficial impact,” “may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability range-wide,” or “likely to result in a loss of viability on the planning area, in a trend to federal listing, or a loss of species viability range-wide.”

6.1 Forested mammals

American marten (*Martes americana*)

History, Status, and Distribution on the Shoshone

American marten have a natural heritage ranking of G5/S3. Historical populations, distribution, or abundance are unknown on the Shoshone.

Marten are a circumboreal species. In North America, they range from Alaska, through Canada, east to Maine, and south into New York, California, and New Mexico, following the boreal forest zone (Patterson et al. 2003). They are associated primarily with mature boreal forests.

Marten are known to occur throughout the mountainous regions of Wyoming, including the Shoshone National Forest. The current population trend is unknown. Marten tracks are commonly seen in the winter, based on past surveys. During the winter of 1995 to 1996 marten tracks were seen along routes at a rate of 0.7 track per mile on the Shoshone. Several of the same routes were run in the winters 2002 to 2003 and 2003 to 2004. In the winter of 2002 to 2003, 50 marten tracks were recorded (USFS 2009a). The winter of 2003 to 2004 was a poor snow year which resulted in less snow tracking. Based on past surveys, marten are likely common on the Forest where suitable habitat exists.

Habitat Distribution and Condition on the Shoshone

Marten habitat in the Rocky Mountains is typically dominated by Engelmann spruce (*Picea engelmannii*) and subalpine fir (*Abies lasiocarpa*). They tend to avoid dry stands of lodgepole pine (*Pinus contorta*) (Buskirk 2002).

On the Shoshone, spruce/fir habitat is relatively abundant. There are about 309,442 acres of spruce/fir on the Forest with about 30 percent of it being mature (over 200 years old) (USFS 2012b). About 178,678 acres of spruce/fir habitat is within wilderness. Due to fire suppression, the spruce/fir forest type has likely increased on the Forest. This suggests that there is relatively abundant potential habitat for marten on the Shoshone. Additional habitat may be available in mature lodgepole pine or Douglas-fir that is succeeding to spruce/fir.

Spruce/fir habitat on the Shoshone has recently been impacted by spruce budworm and spruce beetle. From 2000 to 2009, about 11,003 acres have been affected by spruce budworm and 256,310 acres by spruce beetle. In 2010, about 3,743 acres have been impacted by spruce budworm and 57,362 acres by spruce beetle (USFS 2012a). In addition, Western balsam bark beetle has been impacting subalpine fir. From 2000 to 2009, about 117,299 acres have been impacted. In 2010, about 39,811 acres were impacted by western balsam bark beetle. These outbreaks may be reducing the potential habitat to some degree.

It is uncertain if these recent insect outbreaks are outside of the historic range of variability. The spruce beetle attack on Carter Mountain was atypical in that beetles killed small-diameter trees as well as large-diameter trees (USFS 2012a).

Risk Factors

The primary risk factors from forest management include timber harvest and associated road construction/reconstruction, fuelwood collection, and fire suppression. Other risk factors include

epidemic-level insect outbreaks within suitable habitat and wildfire. At the local population level, trapping is an additional risk factor.

Habitat and Population Management Considerations

Trapping has historically been a major source of mortality for marten. In Wyoming, marten can legally be trapped. Ease of trapping is known to be of more concern with increased road densities that allow access to prime habitat (Buskirk and Ruggiero 1994).

There are currently no known diseases, usually plague or distemper, or predation problems known for marten that are outside of the range of what likely has occurred over time.

Timber harvest can have a variable effect on marten depending on the harvest type (Buskirk 2002). Marten are sensitive to reductions in patch size. Regeneration harvest types would have the greatest impact on marten habitat. Timber harvest occurs at a very small scale compared to the available habitat on the Shoshone, so overall risks would be low.

Given the natural patchiness of the Forest, maintaining connectivity between habitats would be important.

Fire suppression has both positive and negative impacts to marten habitat. In the short term, spruce/fir habitat has likely increased with increased amounts of coarse woody debris. In the long term, fire suppression increases the likelihood of catastrophic fires that would cause major losses of marten habitat (Buskirk 2002). Insect outbreaks are likely increasing the risk of catastrophic wildfires.

Fuelwood collection could remove coarse woody debris from potential marten habitat. Fuelwood collection is limited to areas near roads, so the overall risk to marten habitat is low.

Conservation Measures

In order to provide management for the species to maintain or improve its potential distribution on the Forest, conservation measures need consideration for incorporation into Forest Plan goals, objectives, standards and guidelines. Given the amount of potential habitat in wilderness, and potential impacts from forest management are limited to roaded areas (timber harvest/fuelwood collection), viability risk from forest management is low.

Conservation measures summarized include:

- 1) To maintain habitat connectivity, retain snags and coarse woody debris of adequate size and density within regeneration harvest units.
- 2) In general, implementation of the Northern Rockies Lynx Management Direction (USFS 2007) would benefit marten as well. Especially, standards and guidelines related to vegetation management.

Monitoring Considerations

Of most importance for this species would be the inventory and management of mature conifer stands and distribution on the Shoshone. This would include the location and extent of insect outbreaks and recent wildfires. Both of which are currently inventoried on an annual basis.

Effects Analysis: The primary activity that could potentially influence primary habitat for this species is timber harvest and associated activities such as road construction or use. To a lesser

degree, winter motorized (i.e., snowmobile use) and summer recreation may also impact the marten due to increased disturbances within suitable habitat. Although not a planned activity, wildland fire use could also potentially influence the marten if large-scale burns reduce suitable habitat components. Differences in projected outputs by alternative for these activities are displayed below in Table BE- 3.

Table BE- 3 Activities and outputs that could influence the American marten and hoary bat by alternative

	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Suitable Timber base acres	86,269	127,009	122,103	124,453	179,666	251,205
Vegetation Treatment Acres Mechanical and Mechanical w/Prescribed Fire(Total)	15,470	15,575	14,471	15,062	17,905	21,716
Douglas-fir	2,924	2,937	2,336	2,632	3,181	4,250
Spruce/fir	1,411	1,415	1,057	1,263	1,547	1,768
Lodgepole pine	5,291	5,319	5,641	5,361	7,058	9,211
Limber pine	612	617	547	575	637	672
Whitebark pine	540	540	270	514	544	548
Aspen	624	628	529	616	641	664
Vegetation Treatment Acres Prescribed Fire(Total)	23,559	23,302	23,299	23,342	22,823	21,910
Douglas-fir	4,949	4,869	4,836	4,871	4,748	4,585
Spruce/fir	550	544	495	525	554	566
Lodgepole pine	1,974	1,969	2,021	1,977	2,191	2,449
Limber pine	1,739	1,720	1,720	1,721	1,655	1,543
Whitebark pine	344	341	302	338	330	312
Aspen	918	909	899	911	878	823
Wildfire Acres	185,152	182,900	184,132	183,703	174,983	161,363
Road Construction Miles-Timber	2	2	2	2	3	4
Miles of open motorized roads and trails-Summer(total)	906	929	788	914	936	966
Miles of open motorized roads and trails (Winter total)	670	686	229	675	691	966
Miles of snowmobile trails	276	276	163	276	276	367
Motorized Recreation-Winter(Acres available)	887,590	479,848	103,010	323,687	525,175	825,219
Motorized Recreation-Winter(Acres not available)	1,550,440	1,958,182	2,330,849	2,114,343	1,912,855	1,612,810

Table BE- 3 Activities and outputs that could influence the American marten and hoary bat by alternative

	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Winter Range Motorized Closure (total)	173,828	156,608	224,422	155,380	116,619	
Motorized Recreation-Summer (Acres available)	570,555	570,826	322,381	350,573	656,460	823,907
Motorized Recreation-Summer (Acres not available)	1,867,475	1,867,203	2,115,648	2,087,456	1,781,570	1,614,123
Ski Area Development Or Expansion		1,145	1,145	1,145	1,145	1,145

*Direct and Indirect Effects***Alternative A: No action**

In regard to activities that could potentially influence the American marten, alternative A designates the least amount of suitable timber base (86,269 acres) as compared to alternatives B-F, while offering approximately the same amount of suitable habitat (1,961 acres) to active management as alternatives B and D, more acres than alternative C, but fewer acres (approximately 140 and 373 acres), than alternatives E and F, respectively, that could potentially alter the habitat components preferred by the species.

As displayed in Table BE- 3, the predicted timber harvest output in primary habitat varies from 1,552 to 2,334 acres and is very minimal in all alternatives. These amounts represent about 2 to 3 percent of the total suitable habitat on the Shoshone. The amount of timber harvest in alternative A is therefore expected to have little, if any, influence on American marten habitat or populations on the Shoshone. Construction of new roads as result of timber harvest that would remain open to public use is very minimal for all alternatives; estimated between 2 to 4 miles. Additional fragmentation effects may be associated with these activities, but are expected to be minor because of the large amount of unroaded area that remains undeveloped.

Alternative A offers the third highest amount of motorized recreation compared to the other alternatives. This difference could potentially allow greater disturbances to the solitude that marten prefer, depending upon the type, timing, and scope of the activity. Greater winter travel via snowmobiles could theoretically alter snow conditions and allow low-elevation predators to access more winter habitat due to snow compaction.

Wildland fire use is not a planned output. However, it will be utilized as a tool to allow natural disturbances to occur within suitable marten habitat as opportunities arise. It is estimated that all alternatives may allow from 161,363 to 185,152 acres of wildland fire use. Depending upon fire severity and scale, these outputs could have negative or positive influences on American marten.

Action Alternatives: Alternative B-F

As displayed in Table BE- 3, there is little difference between no action and alternatives B-F in regard to vegetation treatment acres in suitable marten habitat

(92,832 acres). Construction of new roads as result of timber harvest that would remain open to public use is very minimal for all alternatives; estimated between 2 to 4 miles. Alternative F offers the greatest amount of vegetation treatment area where this activity may occur. However, less than 3 percent of suitable marten habitat is influenced by all alternatives and is expected to have no detectable effect on American marten.

As displayed in Table BE- 3, and consistent with its theme, alternative C offers fewer potential disturbances than the other alternatives from both summer and winter motorized recreation because of decreases in the amount of motorized use area. Consistent with their themes, alternative D offers the next fewest motorized acres, while alternative F offers the highest amount of acreage. Alternatives B and E offer a balance between the other action alternatives, but provide less solitude habitat than no action. Although the marten is not highly sensitive to motorized disturbance, reductions in open motorized areas should decrease the potential for displacement or disturbances.

As with no action, it is estimated that wildland fire use may be used as a management tool on 161,363 to 185,152 acres in all action alternatives. Depending upon fire severity and scale, these outputs could have negative or positive influences on American marten.

Cumulative Effects

The single-most influential habitat management action undertaken in potential marten habitat on the Shoshone is timber harvesting. As previously discussed, timber harvest occurs at a very small scale compared to the available habitat on the Forest. For the past 10 years (2002 to 2011) approximately 18,751 acres of vegetative treatment has occurred.

A review of management activities and land use designations on the Shoshone suggests that a considerable amount of suitable habitat for the marten is available, and should remain available, throughout and beyond the current planning period (10 to 15 years). Timber management activities may still influence individual martens where it occurs. However, approximately 57 percent of the spruce/fir habitat on the Shoshone occurs as wilderness that maintains high-quality marten habitat. In addition, all alternatives maintain this protection. Given the natural patchiness of the Forest, maintaining connectivity between habitats would be important.

Due to fire suppression, the spruce/fir forest type has likely increased on the Forest. This suggests that there is relatively abundant potential habitat for marten on the Shoshone. Additional habitat may be available in mature lodgepole pine or Douglas-fir that is succeeding to spruce/fir.

Determination

All plan revision alternatives, including alternative A, **“may adversely impact individuals (American marten), but would not likely result in a loss of viability on the Planning Area, nor cause a trend to federal listing or a loss of species viability rangewide.”** The rationale for this determination follows:

- All alternatives involve projected timber harvest activities in primary habitat types (spruce/fir) that may adversely influence individual marten. However, the projected scope of these activities is very minimal.
- All alternatives involve over-the-snow and summer motorized recreation that may disturb individual marten.
- Extensive late-successional primary habitat occurs on the Shoshone National Forest in wilderness where natural processes will dominate.

Hoary bat (Lasiurus cinereus cinereus)

History, Status, and Distribution on the Shoshone

The hoary bat has a natural heritage ranking of G4/S4. Historical populations, distribution, or abundance are unknown on the Shoshone.

The hoary bat is the most widespread bat in the Americas. They range through the eastern two-thirds of Canada, south through the conterminous United States, Mexico, and South America (NatureServe 2007). During the summer, males occupy the mountains of western North America, while females are found more easterly (Hester and Grenier 2005). In Wyoming, hoary bats occur statewide during the summer, including on the Shoshone. They winter in the southern United States and possibly Mexico.

No trend data is available that is specific to the Shoshone or Wyoming. The Wyoming Game and Fish Department (WGFD) surveyed for bats in northwestern Wyoming in 2009 and detected hoary bats on the Shoshone based on acoustic calls and mist netting (WGFD 2010). Most of the hoary bats detected were males.

Habitat Distribution and Condition on the Shoshone

Hoary bats are associated with forested habitats. Diverse forest habitats with a mixture of forest and small open areas that provide edges are ideal habitat for this species (Hester and Grenier 2005). Hoary bats usually roost in tree foliage and roosts are usually located near forest edges. In a study in Oregon, hoary bats preferred to roost in mature Douglas-fir (Perkins and Cross 1988).

In a study in south central Wyoming, Grover (2002) found that hoary bats almost exclusively used mature lodgepole pine for roosting.

Hoary bat foraging and roosting habitat is abundant on the Shoshone. There are about 309,442 acres of spruce/fir, 345,273 acres of Douglas-fir, 382,886 acres of lodgepole pine, and 190,609 acres of whitebark pine on the Forest (USFS 2012b). Some evidence suggests that lodgepole pine has become less abundant in the last century, while spruce/fir has increased (USFS 2012a). Fire suppression reinforces this trend, but increases in wildfire and insect outbreaks may begin to reverse this trend.

Forest inventory data indicates that about 30 percent of the spruce/fir is mature (over 200 years old); about 22 percent of the lodgepole pine is mature (over 150 years old); about 16 percent of the Douglas-fir is mature (over 200 years old); and about 23 percent of the whitebark pine is mature (over 200 years old) (USFS 2009). This suggests that there is abundant potential roosting habitat for hoary bats on the Shoshone.

In recent years, the Forest has experienced large wildfires and insect epidemics. About 115,000 acres have burned in the last 5 years and about 161,500 acres in the last 10 years (USFS 2012a).

Over the past 11 years, widespread bark beetle epidemics have occurred on the Shoshone.

Insect outbreaks and wildfires are likely reducing habitat to some degree for hoary bats on the Shoshone. Climate change increases the potential for more and continued insect outbreaks and also increases the frequency of fires (Rice et al. 2012).

Risk Factors

The primary risk factor from forest management is timber harvest. Other risk factors include pesticides and other containments and human-caused mortality during migration (wind turbines and communication towers). These other risk factors occur off of the Shoshone.

Natural risk factors would include epidemic insect outbreaks and wildfire.

Since this species is a summer resident in Wyoming and does not appear to use caves, mines, etc., for hibernacula, white nose syndrome is currently not a risk factor.

Habitat and Population Management Considerations

Maintaining mature conifer forest for roosting and diverse forest habitat for foraging would be the most important forest management emphasis for hoary bats. Hoary bats are known to show fidelity to roosting areas (Grover 2002).

Conservation Measures

In order to provide management for hoary bats and to maintain or improve its potential distribution on the Shoshone, the following conservation measures were developed for incorporation into Forest Plan goals, objectives, standards and guidelines. Given the abundance of mature conifer forest on the Forest, overall viability risk from forest management to hoary bats is low.

Conservation measures (Hester and Grenier 2005) summarized include:

- 1) In areas where hoary bats are known to occur, conduct timber harvest activities from October 1 to April 15, if feasible, to avoid impacting breeding and migrating populations.
- 2) Manage land where hoary bats occur that provides adequate roosting and foraging habitat to maintain stable populations (secure roosting sites and diverse forest habitats with a mixture of forest and small open areas).

Monitoring Considerations

Important monitoring considerations for hoary bats would be to cooperate with the WGFD to continue to survey for bats and determine their distribution on the Shoshone.

Effects Analysis: The primary risk factor for the hoary bat from forest management is timber harvest. Other risk factors include pesticides and other containments and human-caused mortality during migration (wind turbines and communication towers). Although not a planned activity, wildland fire use could also potentially influence the marten if large-scale burns reduce suitable habitat components. Differences in projected outputs by alternative for these activities are displayed in Table BE- 3.

Direct and Indirect Effects

Alternative A: No action

In regard to activities that could potentially influence the hoary bat, alternative A designates the least amount of suitable timber base (86,269 acres) as compared to alternatives B-F, while offering approximately the same amount of suitable habitat (17,000 to 17,900 acres) to active management as alternatives B-D; fewer acres than alternatives E and F by approximately 2,170

and 5,700 acres, respectively, that could potentially alter the habitat components preferred by the species.

As displayed in Table BE- 3, the predicted timber harvest output in primary habitat varies from 17,000 to 23,700 acres and is very minimal in all alternatives. These amounts represent about 6 to 8 percent of the total suitable habitat on the Shoshone. The amount of timber harvest in alternative A is therefore expected to have little, if any, influence on hoary bat habitat or populations on the Shoshone. Construction of new roads as result of timber harvest that would remain open to public use is very minimal for all alternatives; estimated between 2 to 4 miles.

Wildland fire use is not a planned output. However, it will be utilized as a tool to allow natural disturbances to occur within suitable hoary bat habitat as opportunities arise. It is estimated that all alternatives may allow from 161,363 to 185,152 acres of wildland fire use. Depending upon fire severity and scale, these outputs could have negative or positive influences on hoary bat.

Action Alternatives: Alternatives B-F

As displayed in Table BE- 3, there is little difference between no action and alternatives B-F in regard to vegetation treatment acres. The amount of timber harvest in all alternatives is therefore expected to have little, if any, influence on hoary bat habitat or populations on the Shoshone. Construction of new roads as result of timber harvest that would remain open to public use is very minimal for all alternatives; estimated between 2 to 4 miles. Alternative F offers the greatest amount of vegetation treatment area where this activity may occur. However, all alternatives influence suitable hoary bat habitat (288,807 acres of mature habitat) from 6 to 8 percent and are expected to have no detectable effect on the species.

As with no action, it is estimated that wildland fire use may be used as a management tool on 161,363 to 185,152 acres in all action alternatives. Depending upon fire severity and scale, these outputs could have negative or positive influences on hoary bat.

Cumulative Effects

The single-most influential habitat management action undertaken in potential hoary bat habitat on the Shoshone is timber harvesting. As previously discussed, timber harvest occurs at a very small scale compared to the available habitat on the Shoshone. For the past 10 years (2002 to 2011), approximately 18,751 acres of vegetative treatment has occurred.

A review of management activities and land use designations on the Shoshone suggests that a considerable amount of suitable habitat for the hoary bat is available, and should remain available, throughout and beyond the current planning period (10 to 15 years). Timber management activities may still influence individual hoary bats where it occurs. However, approximately 92 percent of the suitable habitat (mature spruce/fir, lodgepole pin, Douglas-fir, and whitebark pine,) on the Shoshone will not receive planned vegetative treatment.

Some evidence suggests that lodgepole pine has become less abundant in the last century, while spruce/fir has increased (USFS 2012a). Fire suppression reinforces this trend, but increases in wildfire and insect outbreaks may begin to reverse this trend.

Determination

All Plan revision alternatives, including alternative A, “**may adversely impact individuals (hoary bat), but would not likely result in a loss of viability on the Planning Area, nor cause**

a trend to federal listing or a loss of species viability rangewide.” The rationale for this determination is as follows:

- All alternatives involve projected timber harvest activities in primary habitat types (spruce/fir, Douglas-fir, lodgepole pine, whitebark pine) that may adversely influence individual hoary bats. However, the projected scope of these activities is very minimal.
- Extensive late-successional primary habitat occurs on the Shoshone National Forest in wilderness where natural processes will dominate.

North American wolverine (Gulo gulo)

History, Status, and Distribution on the Shoshone

Wolverines have a natural heritage ranking of G4/S2. They are a candidate species for listing under the Endangered Species Act. Historical populations, distribution, or abundance are unknown on the Shoshone.

Wolverines have a circumboreal distribution. In North America, they occupy much of Alaska and northern Canada, and follow the Rocky Mountains south to northwestern Wyoming (Beauvais and Johnson 2004). Northwestern Wyoming, including the Shoshone, is thought to support the southernmost population of wolverines in North America.

Due to low population densities, no trend data is available for the Shoshone or the Greater Yellowstone Ecosystem. Over an 18-year period (1992 to 2009) only three observations of breeding wolverines were made in Wyoming (Inman et al. 2009). As of the winter of 2008-09, the Wildlife Conservation Society had five radio-collared wolverines that had home ranges within northwestern Wyoming (Inman et al. 2009); one of which dispersed to Colorado. Wolverine were also recently documented in the Thorofare region of the Washakie Wilderness (Shoshone National Forest) and Teton Wilderness (Bridger-Teton National Forest), but no wolverines were detected in the North Absaroka Wilderness (Shoshone National Forest), which contains prime habitat for wolverines (Murphy et al. 2011).

Habitat Distribution and Condition on the Forest

Wolverine habitat typically consists of remote, undisturbed and mountainous regions. Habitat consists of mature boreal forest, alpine tundra, and rock. Home ranges are large from 40 square kilometers to 200 square kilometers (Buskirk and Ruggiero 1994). These areas typically contain herds of large ungulates.

Due to the wide use of habitats, there is no limiting habitat association (topography or vegetation type) for wolverines. It is assumed that pockets of mature forest with abundant coarse woody debris is beneficial, along with open areas supporting big game foraging, coupled with boulder fields for denning. The Shoshone contains abundant potential habitat for wolverines, especially in wilderness (Figure BE- 2) (Wildlife Conservation Society 2010, Beauvais and Johnson 2004).

If wilderness areas represent optimal wolverine habitat, then the Shoshone contains about 1,365,154 acres of potential habitat. One large area of potential wolverine habitat that is not in wilderness is the Beartooth Plateau. Winter motorized recreational use of this area is high.

On the Shoshone, spruce/fir habitat is relatively abundant. There are about 309,442 acres of spruce/fir on the Forest with about 30 percent of it being mature (over 200 years old) (USFS

2012b). Also, due to fire suppression, the spruce/fir forest type has likely increased on the Shoshone.

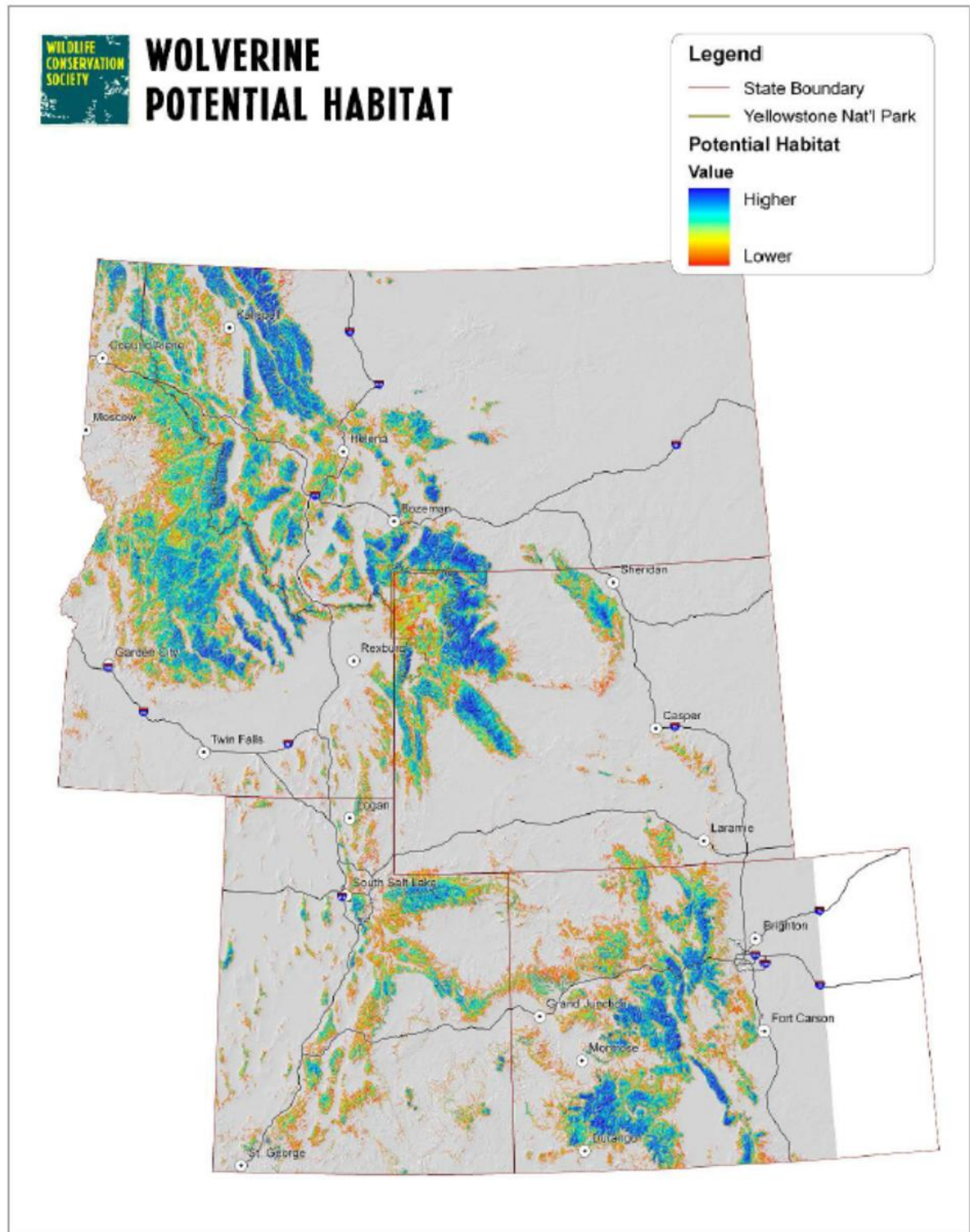


Figure BE- 2 Wolverine habitat identified by Wildlife Conservation Society habitat model across the wolverine's historical range in the Rocky Mountains (WCS 2010)

Risk Factors

The primary risk factor from forest management is winter recreational activities.

Habitat and Population Management Considerations

Fur trapping has historically been a large source of mortality. Wolverines in Wyoming are currently classified as a nongame mammal with full protection from take, including fur harvest. Trapping wolverines is still allowed in Montana. Given the wolverine's large home ranges, it's possible that some wolverines in northwestern Wyoming are at risk to trapping in Montana at some point.

Winter recreation, especially snowmobiling, is a primary source of disturbance for denning wolverines (Beauvais and Johnson 2004, Inman et al. 2009, Olliff and Kaeding 1999). Regulating snowmobile use in important denning areas and deterring wilderness trespassing by snowmobiles are important.

Land-use conversion due to development and roads is an important risk factor. This is most evident on lands adjacent to the Forest. Some of these areas may serve as linkage areas between suitable habitats.

Climate change could also impact wolverines (Rice et al. 2012, Inman et al. 2009). Wolverines are adapted to cold temperatures and snow. Changes in climate may result in increased competition for food and less successful den site selection (Inman et al. 2009).

Conservation Measures

Although abundant habitat exists in wilderness areas, high value wolverine habitat outside of wilderness may be at risk, therefore, there is some viability concern on the Shoshone. In order to address these concerns and to provide management for this species to maintain or improve its potential distribution on the Forest, conservation measures need to be considered for incorporation into Forest Plan goals, objectives, standards, and guidelines.

Conservation measures summarized include:

- 1) In general, implementation of the Northern Rockies Lynx Management Direction (USFS 2007) would benefit wolverines as well. Especially, standards and guidelines related to vegetation management and winter recreation.
- 2) If important denning habitat is identified outside of wilderness (i.e., Beartooth Plateau) snowmobiling in these areas may need to be restricted.
- 3) Actively patrol for snowmobiles that are trespassing in wilderness.

Monitoring Considerations

Monitoring the intensity and snowmobile use in the Beartooth Plateau area could be important, especially if the wolverine is listed in the future. If listed, it could greatly restrict snowmobile use in this area.

The Shoshone will continue to collaborate with other agencies and organizations to monitor wolverines in the Greater Yellowstone Ecosystem.

Effects Analysis: Plan revision activities that could potentially influence the wolverine involve road construction/reconstruction, motorized and non-motorized recreation, and ski area

development. Differences in projected outputs by alternative for these activities are displayed in Table BE- 4.

Table BE- 4 Activities and outputs that could Influence the North American wolverine by alternative

	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Motorized Recreation-Winter(Acres available)	887,590	479,848	103,010	323,687	525,175	825,219
Motorized Recreation-Winter(Acres not available)	1,550,440	1,958,182	2,330,849	2,114,343	1,912,855	1,612,810
Motorized Recreation-Summer (Acres available)	570,555	570,826	322,381	350,573	656,460	823,907
Motorized Recreation-Summer (Acres not available)	1,867,475	1,867,203	2,115,648	2,087,456	1,781,570	1,614,123
Ski Area Development Or Expansion		1,145	1,145	1,145	1,145	1,145
Wilderness Acres	1,365,154	1,365,154	1,968,181	1,558,954	1,365,154	1,365,154

Direct and Indirect Effects

Alternative A: No action

Direct/Indirect Effects: As displayed in Table BE- 4, the no-action alternative offers the most acres, approximately 887,600 acres for over-the-snow motorized travel. Although this alternative did not recognize Sleeping Giant Ski Area, nonetheless the effects of the ski area under alternative A are the same as the action alternatives (B-F). No expansion of the ski area boundary is proposed in any of the alternatives, which is important to the conservation and future habitat options for the wolverine.

Action Alternatives: Alternative B-F

As displayed in Table BE- 4, the action alternatives differ in the amount of solitude and undeveloped terrain potentially available for the wolverine. Of the action alternatives, alternative F offers the largest amount of acres available to winter motorized recreation. In concert with their themes, alternatives C and D offer the least amount of acres available for motorized travel. Alternatives C and D, therefore, offer the highest probability of maintaining habitat options for species such as the wolverine that depend on solitude, little human disturbance, and undeveloped terrain. Alternatives B and E offer a balance between the three other action alternatives, but also provide more undisturbed habitat and less potential disturbances than no action.

In regard to undeveloped habitat, alternatives B-F are the same as alternative A where no expansion of the ski area boundary is proposed.

Cumulative Effects

A considerable amount of wilderness and unfragmented habitat remains in the Shoshone. Recreational use on the Forest has increased to a point that previously undisturbed areas are now supporting various types of extreme sports and other recreational pursuits. These activities have the potential to reduce the amount of solitude habitat available for species such as the wolverine.

Increasing global temperatures may degrade habitat quality and quantity in the conterminous United States during the 21st Century, triggering reductions in the size of wolverine habitat patches and their connectivity (Schwartz et al. 2009, Copeland et al. 2010). Because of its high average elevation and location, in the continent's interior, the Greater Yellowstone Ecosystem (includes the Shoshone) has some of the largest and most contiguous patches of wolverine habitat in the conterminous United States (Brock et al. 2007, Copeland 2010). Thus, the ecosystem is likely to play an increasingly important role in the population dynamics and persistence of wolverine populations as the regional-scale coverage of spring snow declines.

Determination

Plan revision alternatives A, B, E, and F “**may adversely impact individuals (wolverines), but would not likely result in a loss of viability on the Planning Area, nor cause a trend to federal listing or a loss of species viability rangewide.**” Alternatives C and D could be expected to provide a “Beneficial Impact” to the species. The rationale for this determination is as follows:

- The Shoshone and its connectivity with the Greater Yellowstone Ecosystem provide an abundance of suitable habitat for the wolverine.
- Alternatives A, B, E, and F provide for motorized recreational activities that may further impact the species.
- Alternatives C and D decrease the amount of potential disturbance beyond baseline conditions, and do not allow for further ski area expansion or development.

6.2 Forested birds

Black-backed woodpecker (Picoides arcticus)

History, Status, and Distribution on the Shoshone

The black-backed woodpecker has a ranking of G5/S1. Historical populations, distribution, or abundance are unknown for either species on the Shoshone.

Black-backed woodpeckers are associated with mature coniferous forests. They are often associated with recent burns and insect outbreaks. They have irruptive populations that increase locally following an insect outbreak or wildfire.

The black-backed woodpecker is found only in North America. They range from Alaska, through Canada and as far south as California, Wyoming, Minnesota, and Maine. In Wyoming, they occur in the western mountains and the Black Hills. On the Shoshone, black-backed woodpeckers would be considered rare. Only one bird was observed during surveys from 2002 to 2008 by the Rocky Mountain Bird Observatory (Hanni et al. 2009). There is no population trend available that is specific to the Shoshone.

Habitat Distribution and Condition on the Forest

Black-backed woodpeckers are primarily associated with mature conifer forests. There are about 309,442 acres of spruce/fir, 345,273 acres of Douglas-fir, 382,886 acres of lodgepole pine, and 190,609 acres of whitebark pine on the Shoshone (USFS 2012b). Some evidence suggests that lodgepole pine has become less abundant in the last century, while spruce/fir has increased (USFS 2012a). Fire suppression reinforces this trend, but increases in wildfire and insect outbreaks may begin to reverse this trend.

Forest inventory data indicate that about 30 percent of the spruce/fir is mature (over 200 years old); about 22 percent of the lodgepole pine is mature (over 150 years old); about 16 percent of the Douglas-fir is mature (over 200 years old); and about 23 percent of the whitebark pine is mature (over 200 years old) (USFS 2009). This suggests that there is abundant potential habitat for this woodpecker on the Shoshone.

In recent years, the Shoshone has experienced large wildfires and insect epidemics. About 115,000 acres have burned in the last 5 years and about 161,500 acres in the last 10 years (USFS 2012a).

Over the past 11 years, widespread bark beetle epidemics have occurred on the Shoshone. Table BE- 5 shows the acres affected and the type of insects involved with the outbreaks.

Insect outbreaks and wildfires are creating ideal habitat for this woodpecker and will continue to do so into the future. Climate change increases the potential for more and continued insect outbreaks and also increases the frequency of fires (Rice et al. 2012)

Table BE- 5 Acres of insect-caused mortality on the Shoshone National Forest, 2000-2009 and 2010

Beetle species	Acres affected 2000 through 2009	Acres affected 2010
Spruce beetle (<i>Dendroctonus rufipennis</i>)	256,310	57,362
Douglas-fir beetle (<i>Dendroctonus pseudotsugae</i>)	251, 477	4,705
Mountain pine beetle (<i>Dendroctonus ponderosae</i>)	645,671	227,137
Western balsam bark beetle (<i>Dryocoetes confuses</i> <i>Swaine</i>)	117,299	39,811
Spruce budworm (<i>Choristoneura occidentalis</i>)	11,003	3,743

Timber harvest activity has removed a minor amount of potential habitat (Table BE- 6), but an abundance of mature conditions and continued levels of insect outbreaks also indicate the potential for populations to be within a normal range of occurrence. As stated earlier, populations fluctuate naturally in response to prey abundance.

Table BE- 6 Shoshone vegetation treatment history 2002–2011 (acres)

Mechanical Only	19,483
Mechanical with Prescribed Fire	20,267
Total	39,750

Risk Factors – Forest Management

Primary risk factors for these woodpeckers from forest management activities include: Timber harvest in mature conifer forest; fire salvage logging, and fire suppression. All of these activities reduce the amount of potential habitat.

Habitat and Population Management Considerations

A substantial amount of potential habitat for this woodpecker and areas where natural processes dominate the landscape occurs in wilderness on the Shoshone. Outside of wilderness, management activities will never be able to fully or even effectively control insect outbreaks, fire,

or blowdown. Therefore, it's assumed that habitat would be provided outside of wilderness as well.

Timber harvest has the potential to remove habitat. The highest impact would be post-fire salvage logging and regeneration harvest types. Timber harvest occurs at a very small scale compared to the available habitat on the Shoshone, so overall risks would be low.

Fire suppression has the potential to be a risk, since black-backed woodpeckers rely on fire to create habitat. Allowing wildland fire use would be important for creating and maintaining habitat for these species.

Conservation Measures

In order to provide management for these species and to maintain or improve its potential distribution on the Shoshone, the following conservation measures were developed for incorporation into Forest Plan goals, objectives, standards and guidelines. Given the potential for wildfires and insect epidemics, and a substantial amount of habitat on the forest that would not be affected by timber harvest, viability risk from forest management to black-backed woodpeckers is low.

Conservation measures summarized include:

- 1) Retain snags in timber harvest units of an adequate size and density, if adjacent forest lacks potential habitat.
- 2) Allow for wildland fire use, where appropriate, to provide foraging and nesting habitat in mature conifer areas.

Monitoring Considerations

Of most importance for this species would be the inventory and management of mature conifer stands and distribution on the Forest. This would include the location and extent of insect outbreaks and recent wildfires. Both of which are currently inventoried on an annual basis.

Effects Analysis: Forest Service management activities that may have effects to black-backed woodpecker habitats include timber harvest (salvage logging), fire suppression, removal of fire killed/insect infested trees, conversion of mature and late successional forest to young stands with decayed trees, human disturbance near nest sites. Differences in projected outputs by alternative for these activities are displayed in Table BE- 7.

Table BE- 7 Activities and outputs that could influence the black-backed woodpecker by alternative

	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Suitable Timber base acres	86,269	127,009	122,103	124,453	179,666	251,205
Vegetation Treatment Acres Mechanical and Mechanical w/Prescribed Fire(Total)	15,470	15,575	14,471	15,062	17,905	21,716
Douglas-fir	2,924	2,937	2,336	2,632	3,181	4,250
Spruce/fir	1,411	1,415	1,057	1,263	1,547	1,768
Lodgepole pine	5,291	5,319	5,641	5,361	7,058	9,211
Limber pine	612	617	547	575	637	672

Table BE- 7 Activities and outputs that could influence the black-backed woodpecker by alternative

	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Whitebark pine	540	540	270	514	544	548
Aspen	624	628	529	616	641	664
Vegetation Treatment Acres Prescribed Fire(Total)	23,559	23,302	23,299	23,342	22,823	21,910
Douglas-fir	4,949	4,869	4,836	4,871	4,748	4,589
Spruce/fir	550	544	495	525	554	566
Lodgepole pine	1,974	1,969	2,021	1,977	2,191	2,449
Limber pine	1,739	1,720	1,720	1,721	1,655	1,543
Whitebark pine	344	341	302	338	330	312
Aspen	918	909	899	911	878	823
Wildfire Acres	185,152	182,900	184,132	183,703	174,983	161,363

*Direct and Indirect Effects***Alternative A: No action**

In regard to activities that could potentially influence the blacked-back woodpecker, Alternative A designates the least amount of suitable timber base (107,227 acres) as compared to alternatives B-F, while offering approximately the same amount of suitable habitat (17,500 to 18,100 acres) to active management as alternatives B-D; less acres than alternative E and F by approximately 2,060 and 6,300 acres, respectively, that could potentially alter the habitat components preferred by the species.

As displayed in Table BE- 7, the predicted timber harvest output in primary habitat varies from 17,500 to 23,800 acres and is very minimal in all alternatives. These amounts represent about 6 to 8 percent of the total suitable habitat on the Shoshone. The amount of timber harvest in alternative A is therefore expected to have little, if any, influence on blacked-back woodpecker habitat or populations on the Shoshone. Construction of new roads as result of timber harvest that would remain open to public use is very minimal for all alternatives; estimated between 2 to 4 miles.

Wildland fire use is not a planned output. However, it will be utilized as a tool to allow natural disturbances to occur within suitable blacked-back woodpecker habitat as opportunities arise. It is estimated that all alternatives may allow from 161,363 to 185,152 acres of wildland fire use. Depending upon fire severity and scale, these outputs could have negative or positive influences on blacked-back woodpecker.

Action Alternatives: Alternatives B-F

As displayed in Table BE- 7, there is little difference between no action and Alternatives B-F in regards to vegetation treatment acres. The amount of timber harvest in alternative A is therefore expected to have little, if any, influence on black-backed woodpecker habitat or populations on the Shoshone. Construction of new roads as result of timber harvest that would remain open to public use is very minimal for all alternatives; estimated between 2 to 4 miles. Alternative F offers the greatest amount of vegetation treatment area where this activity may occur. However,

all alternatives influence suitable black-backed woodpecker habitat (288,807 acres of mature habitat) from 6 to 8 percent and are expected to have no detectable effect on the species.

As with no action, it is estimated that wildland fire use may be used as a management tool on 161,363 to 185,152 acres in all action alternatives. Depending upon fire severity and scale, these outputs could have negative or positive influences on woodpeckers.

Cumulative Effects

The single-most influential habitat management action undertaken in potential black-backed woodpecker habitat on the Shoshone is timber harvesting. As previously discussed, timber harvest occurs at a very small scale compared to the available habitat on the Forest. For the past 10 years (2002 to 2011) approximately 18,751 acres of vegetative treatment has occurred.

A review of management activities and land use designations on the Shoshone suggests that a considerable amount of suitable habitat for the black-backed woodpecker is available, and should remain available, throughout and beyond the current planning period (10 to 15 years). Timber management activities may still influence individual black-backed where it occurs. However, approximately 92 percent of the suitable habitat (mature spruce/fir, lodgepole pine, Douglas-fir, and whitebark pine, 288,807 acres) on the Shoshone will not receive planned vegetative treatment.

Some evidence suggests that lodgepole pine has become less abundant in the last century, while spruce/fir has increased (USFS 2012a). Fire suppression reinforces this trend, but increases in wildfire and insect outbreaks may begin to reverse this trend.

Determination

All Plan revision alternatives, including alternative A, “**may adversely impact individuals (black-backed woodpeckers), but would not likely result in a loss of viability on the Planning Area, nor cause a trend to federal listing or a loss of species viability rangewide.**”

The rationale for this determination is as follows:

- All alternatives involve projected timber harvest activities in primary habitat types (spruce/fir, Douglas-fir, lodgepole pine, whitebark pine) that may adversely influence individual woodpeckers. However, the projected scope of these activities is very minimal.
- Extensive late-successional primary habitat occurs on the Shoshone National Forest in wilderness and other back country designations where natural processes will dominate.
- Planned wildland fire use activities will provide benefits to the black-backed woodpecker.

Boreal owl (Aegolius funereus)

History, Status, and Distribution on the Shoshone

The boreal owl has a natural heritage ranking of G5/S2. Historical populations, distribution, or abundance are unknown on the Shoshone.

Boreal owls are found within the boreal forest zone of North America from Alaska, through Canada, to New Mexico. In Wyoming, they are known to occur in the western mountainous regions. Boreal owls have been found on the Shoshone based on past surveys (WGFD 2009). No trend data is available that is specific to the Shoshone.

Areas previously surveyed on the Shoshone were resurveyed in 2008-09, but no boreal owls were located. WGFD (2009) suspect that the lack of boreal owl responses was due to 1) a noticeable increase in snowmobile use between the earlier surveys and the winter of 2008/2009 that may have caused a shift in habitat occupancy due to noise and disturbance factors, 2) habitat suitability changes due increase in beetle killed conifer trees, and/or 3) the timing of the surveys, which may have occurred toward the end of the breeding season so males may not have been as vocal as they would have been earlier in the season.

Habitat Distribution and Condition on the Shoshone

In the Rocky Mountain region, boreal owls typically inhabit mature, high elevation subalpine forests comprised of Englemann spruce, subalpine fir, and mature lodgepole pine, with some use of mature aspen stands that are interspersed with the conifer species listed above (Garber et al. 1991). Based on 31 records, the elevational range for boreal owls in Wyoming during the breeding season is 6,560 to 10,630 feet (2,000 to 3,240 m) (Garber et al. 1991).

On the Shoshone there are about 309,442 acres of spruce/fir and 382,886 acres of lodgepole pine (USFS 2012b). Some evidence suggests that lodgepole pine has become less abundant in the last century, while spruce/fir has increased (USFS 2012a). Fire suppression reinforces this trend, but increases in wildfire and insect outbreaks may begin to reverse this trend. About 178,678 acres of spruce/fir and 110,750 acres of lodgepole pine are within wilderness.

Forest inventory data indicates that about 30 percent of the spruce/fir is mature (over 200 years old) and about 22 percent of the lodgepole pine is mature (over 150 years old) (USFS 2009). This suggests that there is abundant potential habitat for boreal owls on the Shoshone.

Aspen has a limited distribution on the Shoshone and covers roughly 23,295 acres. Field observations indicate that most aspen is mature (USFS 2009).

In recent years, the Forest has experienced insect epidemics. Over the past 11 years, widespread bark beetle epidemics have occurred on the Shoshone. Table BE- 5 indicates the acres affected and the type of insects involved with the outbreaks (USFS 2012a). Insect outbreaks may be reducing habitat for boreal owls and will continue to do so into the future. Climate change increases the potential for more and continued insect outbreaks and also increases the frequency of fires (Rice et al. 2012).

Risk Factors

The primary risk factor from forest management is timber harvest in mature spruce/fir habitat. Other risk factors include epidemic insect outbreaks in spruce/fir habitat and stand replacement wildfires in spruce/fir habitat

Habitat and Population Management Considerations

Retaining adequate snags and large diameter trees would be important management emphasis in silvicultural prescriptions in spruce/fir forest types. As boreal owls prefer these forest types, uneven-aged management should be used to retain mature overstory and a diverse understory component (Hayward and Hayward 1993).

Since boreal owls use aspen to some degree, any management activity that sought to perpetuate and/or expand aspen would be beneficial.

From a population standpoint, increased inventory would need to occur to confirm presence/absence and improve distribution information.

Conservation Measures

In order to provide management for this species to maintain or improve its potential distribution on the Shoshone, the following conservation measures were developed for incorporation into Forest Plan goals, objectives, standards and guidelines. Given the substantial amount of habitat on the forest that would not be affected by timber harvest, viability risk from forest management to boreal owls is low.

Conservation measures summarized include:

- 1) Where appropriate, utilize uneven-aged management within harvest units in mature spruce/fir habitat. This will provide adequate snags and large diameter trees to maintain habitat within the harvest units.
- 2) Manage aspen for retention and expansion over current levels.
- 3) Should active owl nests be found, protect the nest site with a timing restriction and appropriate buffer. Nest stands from 4 to 35 acres have been reported for boreal owls (Hayward and Hayward 1993).

Monitoring Considerations

Continue to cooperate with the WGFD to periodically complete boreal owl surveys on the Shoshone.

Habitat monitoring should include the inventory and management of mature conifer stands and distribution on the Shoshone. This would include the location and extent of insect outbreaks and recent wildfires. Both of which are currently inventoried on an annual basis.

Effects Analysis: Plan revision activities that could potentially influence the boreal owl primarily involve timber harvest. Although not a planned activity, wildland fire use could also potentially have negative influences on the boreal owl because of reduced forest cover, snags, and food resources. Differences in projected outputs by alternative for these activities are displayed in Table BE- 8.

Table BE- 8 Activities and projected outputs that could potentially influence the boreal owl, by alternative

	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Suitable Timber Base Acres	86,269	127,009	122,103	124,453	179,666	251,205
Vegetation Treatment Acres Mechanical and Mechanical w/Prescribed Fire (Total)	15,450	15,575	14,471	15,062	17,905	21,176
Spruce/fir	1,411	1,415	1,057	1,263	1,547	1,768

Table BE- 8 Activities and projected outputs that could potentially influence the boreal owl, by alternative

	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Vegetation Treatment Acres Prescribed Fire(Total)	23,559	23,302	23,299	23,342	22,823	21,910
Spruce/fir	550	544	495	525	554	566
Wildfire Acres	185,152	182,900	184,132	183,703	174,983	161,363

*Direct and Indirect Effects***Alternative A: No action**

In regard to activities that could potentially influence the boreal owl, alternative A designates the least amount of suitable timber base (86,269 acres) as compared to alternatives B-F while offering approximately the same amount of suitable habitat (1,961 acres) to active management as alternatives B and D, more acres than alternative C but fewer acres (approximately 140 and 373 acres) than alternatives E and F, respectively, that could potentially alter the habitat components preferred by the species.

As displayed in Table BE- 8, the predicted timber harvest output in primary habitat varies from 1,552 to 2,334 acres and is very minimal in all alternatives. These amounts represent about 2 to 3 percent of the total suitable habitat on the Shoshone. The amount of timber harvest in alternative A is therefore expected to have little, if any, influence on boreal owl habitat or populations on the Shoshone. Construction of new roads as result of timber harvest that would remain open to public use is very minimal for all alternatives; estimated between 2 to 4 miles. Additional fragmentation effects may be associated with these activities but are expected to be minor because of the large amount of unroaded area that remains undeveloped.

Wildland fire use is not a planned output. However, it will be utilized as a tool to allow natural disturbances to occur within suitable boreal owl habitat as opportunities arise. It is estimated that all alternatives may allow from 161,363 to 185,152 acres of wildland fire use. Depending upon fire severity and scale, these outputs could have negative or positive influences on boreal owls.

Action Alternatives: Alternatives B-F

As displayed in Table BE- 8, there is little difference between no action and alternatives B-F in regard to vegetation treatment acres in suitable boreal owl habitat (92,832 acres). Alternative F offers the greatest amount of vegetation treatment area where this activity may occur. However, less than 3 percent of suitable boreal owl habitat is influenced by all alternatives and they are expected to have no detectable effect on this species.

As with no action, it is estimated that wildland fire use may be used as a management tool on 161,363 to 185,152 acres in all action alternatives. Depending upon fire severity and scale, these outputs could have negative or positive influences on boreal owls.

Cumulative Effects

No cumulative effects on the boreal owl are anticipated because of the minimal amount of activities projected to occur in primary habitat and the large amount of undeveloped area that will remain on the Shoshone well into the future.

Determination

All Plan revision alternatives, including alternative A, “**may adversely impact individuals (boreal owls), but would not likely result in a loss of viability on the Planning Area, nor cause a trend to federal listing or a loss of species viability rangewide.**” The rationale for this determination is as follows:

- All alternatives involve projected timber harvest activities in primary habitat types (spruce/fir) that may adversely influence individual boreal owls. However, the projected amount of these activities is very minimal.
- Extensive late-successional primary habitat occurs on the Shoshone National Forest in wilderness and other back country designations where natural processes will dominate and provide excellent habitat for the boreal owl.

Northern goshawk (Accipiter gentilis atricapillus)

History, Status, and Distribution on the Shoshone

The northern goshawk has a natural heritage ranking of G5/S3. Historical populations, distribution, or abundance are unknown on the Shoshone.

Northern goshawks are a circumboreal species. In North America they range from Alaska, through most of Canada, south to Mexico, Wisconsin, and the New England states (Squires and Reynolds 1997). Goshawks are known to occur throughout most of Wyoming where suitable habitat exists, except the far southeastern portion of the state (Smith and Keinath 2004). Goshawks are known to breed on the Shoshone.

No trend data is available that is specific to the Shoshone or Wyoming. In 2004, Wyoming Natural Diversity Database personnel surveyed 13 historic nest sites on the Shoshone. Only 2 nest sites were found to be active (Smith et al. 2005). More recent surveys in 2006 and 2009 that followed the National Goshawk Protocol indicated 2 active territories within 5 habitat blocks in 2006 and 3 active territories within 10 habitat blocks in 2009 (USFS 2010).

Habitat Distribution and Condition on the Shoshone

Across a goshawk's territory, the habitat often contains multiple forest age classes as well as natural openings. Nest sites require more specific habitat requirements. Goshawk nests in the central Rocky Mountains are typically in lodgepole pine (*Pinus contorta*), mixed conifer, and quaking aspen (*Populus tremuloides*) (Squires and Ruggiero 1996). On the Targhee National Forest, goshawk nests were all located in Douglas-fir (*Pseudotsuga menziesii* var. *glauca*) and lodgepole pine stands.

Potential goshawk nest habitat is relatively abundant on the Shoshone. There are about 382,886 acres of lodgepole pine, 345,273 acres of Douglas-fir, and 23,295 acres of aspen (USFS 2012b). Some evidence suggests that lodgepole pine has become less abundant in the last century, while spruce/fir has increased (USFS 2012a). Fire suppression reinforces this trend, but increases in wildfire and insect outbreaks may begin to reverse this trend.

Forest inventory data indicate that about 16 percent of the Douglas-fir is mature (over 200 years old) and about 22 percent of the lodgepole pine is mature (over 150 years old) (USFS 2009). Field observations indicate that most of the aspen is mature, as well.

In recent years, the Shoshone has experienced insect epidemics. Over the past 11 years, widespread bark beetle epidemics have occurred on the Shoshone. Table BE- 5 indicates the acres affected and the type of insects involved with the outbreaks (USFS 2012a). Insect outbreaks may be reducing habitat for northern goshawks and will continue to do so into the future. Climate change increases the potential for more and continued insect outbreaks and also increases the frequency of fires (Rice et al. 2012).

Timber harvest activity has removed a minor amount of potential nesting habitat.

Risk Factors

The primary risk factors from forest management are timber harvest and fire suppression. Other risk factors include falconry and human disturbance at nest sites.

Natural risk factors include epidemic insect outbreaks and wildfire. Both of which can reduce potential habitat for the long term.

Habitat and Population Management Considerations

Maintaining mature forest conditions around known nests would be the most important forest management emphasis for goshawk habitat. Forest management can impact the structure, function, and quality of nesting and post-fledging habitat by modifying or removing entire nest stands and reducing habitat suitability (Kennedy 2003).

Fire suppression has likely made goshawk habitat more susceptible to catastrophic wildfire. Fires now burn over larger areas, are more intense, and more devastating than in earlier times. Crown fires are now common because of ladder fuels and the high amount of recent tree mortality due to epidemic insect outbreaks.

Reducing human disturbance around known active nests is also important.

Conservation Measures

In order to provide management for goshawks and to maintain or improve potential distribution on the Shoshone, the following conservation measures were developed for incorporation into Forest Plan goals, objectives, standards and guidelines. Given the relatively large amount of habitat on the Forest and by protecting known nest sites, overall viability risk from forest management to goshawks is low.

Conservation measures summarized include:

- 1) Within known goshawk territories, maintain at least a 30-acre buffer of mature forest around known nest sites.
- 2) Within known goshawk territories, maintain at least 60 percent of the goshawk habitat in a mature condition within the post-fledging area. The post-fledgling area should include all known alternate nests. Suitable goshawk habitat consists of mature lodgepole pine, Douglas-fir, and quaking aspen. The post-fledgling area ranges in size from 200 to 425 acres (Kennedy 2003).

- 3) If an active nest is located, avoid project activities within 0.25 mile that would disturb nesting goshawks from April 1 through August 31.
- 4) If project activities will reduce potential nesting habitat within a known goshawk territory, identify and manage alternative and replacement nest sites within the territory.
- 5) Manage aspen for retention and expansion over current levels.

Monitoring Considerations

Important monitoring considerations for goshawks would be the continued monitoring of known nest sites to determine territory occupancy, nest success, and productivity. Also, continue to cooperate with the monitoring of goshawks at the bioregional scale.

Effects Analysis: Plan revision activities that could potentially influence the northern goshawk primarily involve timber harvest, fuels treatments, and wildlife management activities. Motorized and non-motorized recreation could possibly influence nesting in some locations. Differences in projected outputs by alternative for these activities are displayed in Table BE- 9.

Table BE- 9 Activities and outputs that could influence the northern goshawk by alternative

	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Suitable Timber Base Acres	86,269	127,009	122,103	124,453	179,666	251,205
Vegetation Treatment Acres Mechanical and Mechanical w/Prescribed Fire (Total)	15,470	15,575	14,471	15,062	17,905	21,716
Douglas-fir	2,924	2,937	2,336	2,632	3,181	4,250
Lodgepole pine	5,291	5,319	5,641	5,361	7,058	9,211
Aspen	624	628	529	616	641	664
Vegetation Treatment Acres Prescribed Fire(Total)	23,559	23,302	23,299	23,342	22,823	21,910
Douglas-fir	4,949	4,869	4,836	4,871	4,748	4,585
Lodgepole pine	1,977	1,969	2,021	1,977	2,191	2,449
Aspen	918	909	899	911	878	823
Road Construction Miles- Timber	2	2	2	2	3	4
Wildfire Acres	185,152	182,900	184,132	183,703	174,983	161,363
Motorized Recreation- Summer (Acres available)	570,555	570,826	322,381	350,573	656,460	823,907

Direct and Indirect Effects

Alternative A: No action

In regard to activities that could potentially influence the northern goshawk, alternative A designates the least amount of suitable timber base (82,269 acres) as compared to alternatives B-F, while offering approximately the same amount of suitable habitat (16,262 to 16,680 acres) to active management as alternatives B-D; less acres than alternatives E and F by approximately 1,139 and 5,302 acres respectively, that could potentially alter the habitat components preferred by the species. Potential impacts are expected to be minimal and localized.

Treatments in aspen are also similar across alternatives, but may impact individual goshawks because of the intensive treatments involved. Older aspen stands that currently contain the structural characteristics needed to support nest platforms may be targeted for regeneration. Conversely, however, long-term benefits may be associated with regenerating stand conditions.

As displayed in Table BE- 9, the predicted timber harvest output in primary habitat (approximately 162,774 acres) varies from 16,262 to 21,982 acres and is very minimal in all alternatives. These amounts represent about 10 to 14 percent of the total suitable habitat on the Shoshone. The amount of timber harvest in alternative A is therefore expected to have little, if any, influence on northern goshawk habitat or populations on the Shoshone. Construction of new roads as result of timber harvest that would remain open to public use is very minimal for all alternatives; estimated between 2 to 4 miles.

The use of prescribed fire is expected to help restore habitat conditions for the northern goshawk due to a reduction in small-diameter trees that could inhibit effective foraging. The use of prescribed fire is also expected to provide benefits by reducing fuel loads that could result in a high-intensity wildfire that could render habitat unsuitable. Benefits to prey species are also anticipated as small mammals and birds respond to the burn areas. Some impacts may occur to individual goshawks if nesting occurs within a prescribed fire area. The use of prescribed fire is projected to occur on approximately 23,559 acres under alternative A and does not vary across alternatives B-E. Alternative F proposes the least amount of prescribed fire.

Wildland fire use is not a planned output. However, it will be utilized as a tool to allow natural disturbances to occur within suitable northern goshawk habitat as opportunities arise. It is estimated that all alternatives may allow from 161,363 to 185,152 acres of wildland fire use. Depending upon fire severity and scale, these outputs could have negative or positive influences on northern goshawk.

Alternative A along with B offer the third highest amount of motorized recreation compared to the other alternatives. This difference could potentially allow greater disturbances to northern goshawk during nesting season depending upon the type, timing, and scope of the activity.

Action Alternatives: Alternatives B-F

As displayed in Table BE- 9, there is little difference between no action and alternatives B, C, and D in regard to timber harvest. As is consistent with the active management theme, alternative F offers the greatest amount of projected timber activities in all cover types that may be utilized by the northern goshawk. However, all alternatives influence preferred northern goshawk habitat from 10 to 14 percent and are expected to have minimal and localized effect on the species.

As displayed in Table BE- 9, and consistent with its theme, alternative C offers fewer potential disturbances than the other alternatives from summer motorized recreation because of decreases in the amount of motorized use area. Consistent with their themes, alternative D offers the next fewest motorized acres, while alternative F offers the highest amount of acreage. Alternatives B and E offer a balance between the other action alternatives, but provide less solitude habitat than the no action. Reductions in open motorized areas should decrease the potential for displacement or disturbances while nesting.

The use of prescribed fire is projected to occur on approximately 23,559 acres and does not appreciatively vary across alternatives B-E. Alternative F proposes the least amount of prescribed fire. Wildland fire use may be used as a management tool on from 161,363 to 185,152 acres in all alternatives. This could impact individual goshawks if fire occurs in nesting areas.

Cumulative Effects

A review of management activities and land use designations on the Shoshone suggests that a considerable amount of suitable habitat for the northern goshawk is available, and should remain available, throughout and beyond the current planning period (10 to 15 years). Timber management activities may still influence individual goshawk where it occurs. No cumulative effects are expected. Natural fire events will only improve habitat conditions.

Determination

All Plan revision alternatives, including alternative A, “**may adversely impact individuals (northern goshawk), but would not likely result in a loss of viability on the Planning Area, nor cause a trend to federal listing or a loss of species viability rangewide.**” The rationale for this determination follows:

- All alternatives involve projected timber harvest activities in primary habitat types (Douglas-fir, lodgepole pine, aspen) that may adversely influence individual goshawk. However, the projected scope of these activities is very minimal.
- Extensive late-successional primary habitat occurs on the Shoshone National Forest in wilderness and other back country designations where natural processes will dominate.

Olive-sided flycatcher (Contopus cooperi)

History, Status, and Distribution on the Shoshone

Olive-sided flycatchers are considered a G4/S4B species by the State Natural Heritage ranking for Wyoming. Historical populations, distribution or abundance are unknown for this species on the Shoshone.

Olive-sided flycatchers are neotropical migrants that summer in the conifer forest zone of North America from Alaska south through Canada to California, New Mexico, Michigan, and the New England states. They winter in Central and South America (Altman and Sallabanks 2000). In Wyoming, olive-sided flycatchers likely occur within the conifer forests of western Wyoming, including the Shoshone and possibly within the Medicine-Bow and Bighorn National Forests (Kotliar 2007).

They likely occur Forest-wide in typical low abundance within suitable habitat based on recent surveys by the Rocky Mountain Bird Observatory from 2002 to 2008 (Hanni et al. 2009). From 2002 to 2009, the Rocky Mountain Bird Observatory detected 52 total olive-sided flycatchers (Hanni et al. 2009, Rehm-Lorber et al. 2010).

Trend data is not available for olive-sided flycatchers on the Shoshone or in Wyoming. This is likely due to their low occurrence rate on survey routes.

Habitat Distribution and Condition on the Shoshone

In Region 2, olive-sided flycatchers are most often found in higher-elevation spruce/fir forests. They are typically not found in even-aged lodgepole pine stands (Kotliar 2007). They typically nest in post-fire early successional forests. They could be considered a fire-obligate species.

There are about 309,442 acres of spruce/fir on the Shoshone (USFS 2012b). Some evidence suggests that lodgepole pine has become less abundant in the last century, while spruce/fir has increased (USFS 2012a). Fire suppression reinforces this trend, but increases in wildfire and

insect outbreaks may begin to reverse this trend. Forest inventory data indicates that about 30 percent of the spruce/fir is mature (over 200 years old).

In recent years, the Shoshone has experienced large wildfires. About 115,000 acres have burned in the last 5 years and about 161,500 acres in the last 10 years (USFS 2012a). Wildfires are creating ideal habitat for olive-sided flycatchers and will continue to do so into the future.

The current epidemic insect outbreaks may be creating additional habitat, but this has yet to be documented (Kotliar 2007).

Risk Factors

The primary risk factors from forest management are timber harvest and fire suppression. Another primary risk factor is loss of wintering habitat (Kotliar 2007).

Habitat and Population Management Considerations

A substantial amount of potential habitat (178,678 acres of spruce/fir habitat) for olive-sided flycatchers and areas where natural processes dominate the landscape occurs in wilderness on the Shoshone. Habitat is being created in stand-replacement wildfires.

Timber harvest has the potential to create habitat, but this type of habitat may be detrimental to the species. Although olive-sided flycatchers regularly use small forest openings created by logging, they may actually be ecological traps (Kotliar 2007, Altman and Sallabanks 2000). Timber harvest occurs at a very small scale compared to the available habitat on the Shoshone, so overall risks would be low.

Fire suppression has the potential to be a risk, since olive-sided flycatchers appear to rely on fire to create preferred habitat. Allowing wildland fire use would be important for creating and maintaining habitat for this species. High-severity fires create the best olive-sided flycatcher habitat (Kotliar 2007).

Conservation Measures

In order to maintain and improve potential habitat for olive-sided flycatchers on the Shoshone, the following conservation measures were developed for incorporation into Forest Plan goals, objectives, standards and guidelines. Since this species is not of viability concern, these measures would continue to maintain and improve potential habitat for this species.

Conservation measures summarized include:

- 1) Allow for wildland fire use, where appropriate, to provide foraging and nesting habitat.

Monitoring Considerations

Of most importance for this species would be the inventory and management of spruce/fir stands and distribution on the forest. This would include age class distribution of spruce/fir and the location and extent of wildfires. Wildfires are currently inventoried on an annual basis.

Effects Analysis: Plan revision activities that could potentially influence the olive-sided flycatcher primarily involve timber harvest and possibly fuels treatment activities. Differences in projected outputs by alternative for these activities are displayed in Table BE- 10.

Table BE- 10 Activities and outputs that could influence the olive-sided flycatcher by alternative

	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Suitable Timber Base Acres	86,269	127,009	122,103	124,453	179,666	251,205
Vegetation Treatment Acres Mechanical and Mechanical w/Prescribed Fire (Total)	15,470	15,575	14,471	15,062	17,905	21,176
Spruce/fir	1,411	1,415	1,057	1,263	1,547	1,768
Vegetation Treatment Acres Prescribed Fire(Total)	23,559	23,302	23,299	23,342	22,823	21,910
Spruce/fir	550	544	495	525	554	566
Wildfire Acres	185,152	182,900	184,132	183,703	174,983	161,363

*Direct and Indirect Effects***Alternative A: No action**

As displayed in Table BE- 10, the predicted timber harvest output in primary olive-sided flycatcher habitat varies from 1,552 to 2,334 acres and is very minimal in all alternatives. These amounts represent less than 3 percent of the total suitable habitat on the Shoshone. The amount of timber harvest in alternative A is therefore expected to have little influence on the boreal owl or populations on the Shoshone.

Wildland fire use is not a planned output. However, it will be utilized as a tool to allow natural disturbances to occur in high-elevation forest types as opportunities arise. It is estimated that all alternatives may allow from 161,363 to 185,152 acres of wildland fire use. All wildland fire use activities can be expected to have negative influences on the olive-sided flycatcher because of a decrease in habitat components preferred by the species. However, these influences would vary significantly depending upon the size and severity of a wildfire.

Action Alternatives: Alternatives B-F

As displayed in Table BE- 10, there is little difference between no action and alternatives B, C, D, and E in regard to timber harvest. As is consistent with the active management theme, alternative F offers the greatest amount of projected timber output. However, all alternatives influence preferred olive-sided flycatcher habitat (approximately 92,832 acres) by 2 to 3 percent and are expected to have no detectable effect on the species. The large amount of back country and wilderness remaining on Shoshone in all alternatives can be expected to provide mature trees, primary nesting habitat for the olive-sided flycatcher.

As with the no action alternative, it is estimated that Wildland Fire Use may be used as a management tool on 161,363 to 185,152 acres in all action alternatives. Benefits can be expected from any Fire Use activities that permit wildfires to occur.

Cumulative Effects

No cumulative effects on the olive-sided flycatcher are anticipated because of the minimal amount of activities projected to occur in primary habitat and the large amount of undeveloped area that will remain on the Shoshone well into the future.

Determination

All Plan revision alternatives, including alternative A, “**may adversely impact individuals (olive-sided flycatcher), but would not likely result in a loss of viability on the Planning Area, nor cause a trend to federal listing or a loss of species viability rangewide.**” The rationale for this determination follows:

- All alternatives involve projected timber harvest activities in primary habitat types (spruce/fir) that may adversely influence individual olive-sided flycatchers. However, the projected amount of these activities is very minimal.
- Extensive late-successional primary habitat occurs on the Shoshone National Forest in wilderness and other back country designations where natural processes will dominate and provide excellent habitat for the olive-sided flycatchers.

6.3 Grassland/sagebrush mammals

Rocky Mountain bighorn sheep (Ovis canadensis canadensis)

History, Status, and Distribution on the Shoshone

Rocky Mountain bighorn sheep have a natural heritage ranking of G4/S3. They are considered a big game animal in Wyoming.

Rocky Mountain bighorn sheep are found scattered throughout the mountainous regions of western North America from British Columbia and Alberta south to New Mexico and Arizona (Beecham et al. 2007). In Wyoming, they primarily occur in the northwestern part of the state with re-introduced populations in the Bighorn Mountains and several mountain ranges in the southeastern part of the state.

The Shoshone is occupied by six of the eight core native bighorn sheep herds in Wyoming. These core herds include: Francs Peak, Younts Peak, Whiskey Mountain, Trout Peak, Wapiti Ridge, and Clark’s Fork (Figure BE- 3). These core herds currently occupy 67 percent (1.65 million acres) of the Forest. Also, the Temple Peak herd occupies a small portion of the Washakie Ranger District. This herd is not a core herd. The WGFD classifies it as a remnant herd. And, it’s considered a transplant herd and is managed within a “Cooperative Review Area” (Wyoming State-wide Bighorn/Domestic Sheep Interaction Working Group 2004b). Cooperative Review Areas are areas of suitable bighorn sheep range where proposed changes in bighorn sheep management or domestic sheep use will be cooperatively evaluated.

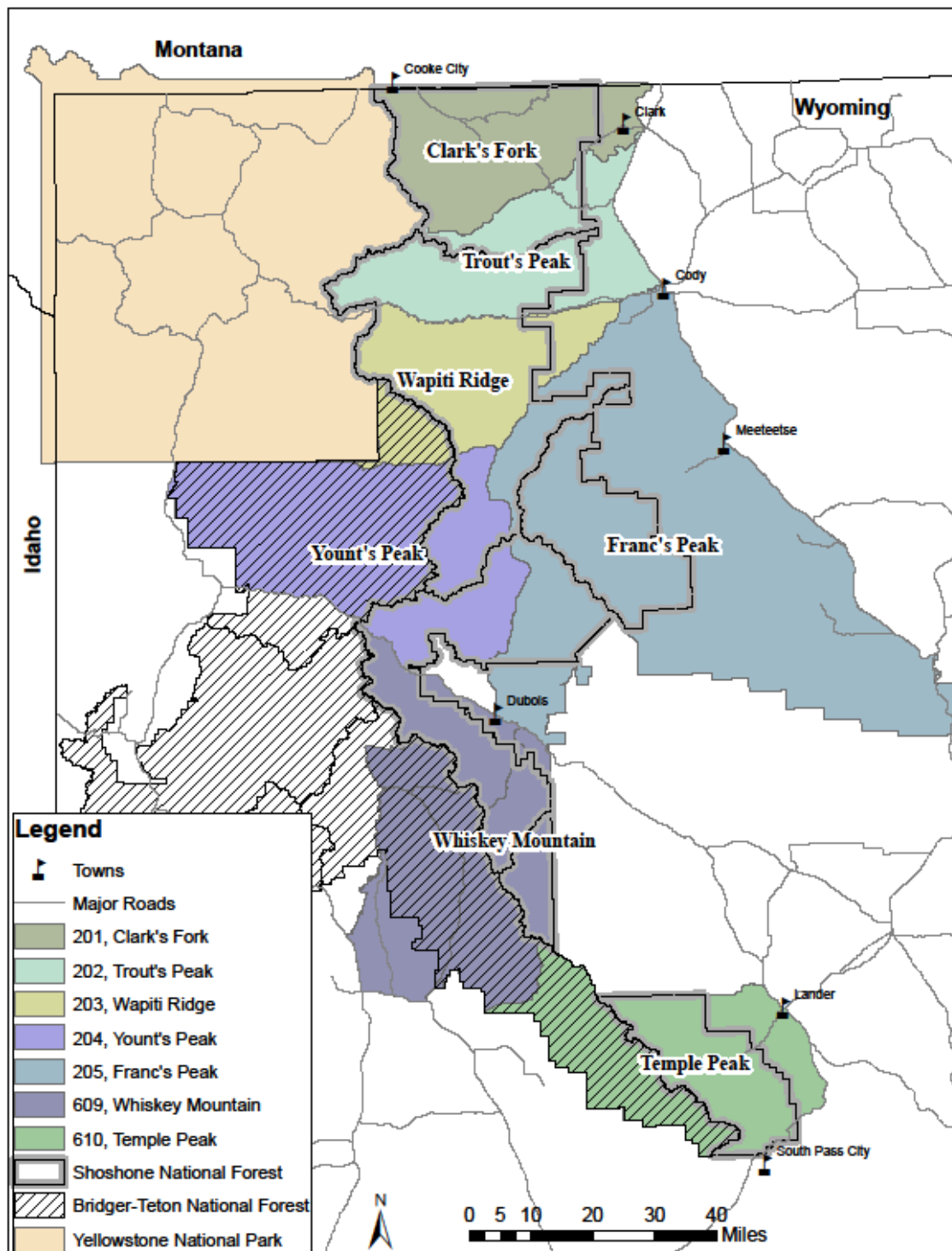


Figure BE- 3 Bighorn sheep herd units, Shoshone National Forest

Francs Peak Bighorn Sheep Herd

This core native herd occupies portions of the Shoshone National Forest and the Wind River Indian Reservation within the Absaroka and Owl Creek mountain ranges. This herd includes

WGFD Hunt Areas 5 (Francs Peak) and 22 (Dubois Badlands), as well as the Owl Creek Mountains in the northern portion of the Wind River Indian Reservation (Beecham et al. 2007).

The population objective for this herd is 1,360 sheep. Current model estimates put the population at 1,400 sheep, or near objective (WGFD 2010b). This sheep herd is considered very healthy and its population has remained stable for the past 6 years. Based on a 10-year average, post-season lamb ratios averaged 29:100, while ram ratios averaged 48:100 (WGFD 2010b).

No domestic sheep grazing occurs within this herd unit. Closest domestic sheep/goat grazing on public lands to the Francs Peak Herd is approximately 3.2 kilometers (2 miles) to the east on Bureau of Land Management (BLM) lands. Because of the concern of disease transmission, five bighorn sheep ewes were removed from the population upon grazing on private land used by domestic sheep (WGFD, personal communication 2012b). Closest domestic sheep/goat grazing on the Shoshone is approximately 112.7 kilometers (70 miles) south of the Francs Peak Herd (Wyoming: Domestic Sheep and Bighorn Sheep Distribution 2011).

Younts Peak Bighorn Sheep Herd

This herd occupies portions of the Shoshone and Bridger-Teton National Forests, primarily within the Absaroka Mountain Range. Younts Peak is the most remote bighorn sheep herd in Wyoming. They are non-migratory and reside year-round on high-elevation ridges (WGFD 2009a). This makes them prone to periodic high mortality losses due to severe winter weather.

The population for this herd is estimated to be at the objective of 900 sheep. The March 2010, lamb:100 ewe ratio was 21:100, and ram:100 ewe ratio was 30:100. The lamb:ewe ratio was below the 5-year (2005 to 2009) average of 29:100 for this herd, as was the ram:ewe ratio that averages 52:100 for this herd (WGFD 2010b). No domestic sheep grazing occurs within this herd unit. Closest domestic sheep/goat grazing on public lands to the Younts Peak Herd is approximately 41.8 kilometers (26 miles) east on BLM lands. Closest domestic sheep/goat grazing on the Shoshone is approximately 136.8 kilometers (85 miles) southeast of the Younts Peak Herd (Wyoming: Domestic Sheep and Bighorn Sheep Distribution 2011).

No pack goat use occurs within this core native herd range.

Whiskey Mountain Bighorn Sheep Herd

This core native herd occupies portions of the Shoshone and Bridger-Teton National Forests and the Wind River Indian Reservation within the Wind River Mountain Range. This herd includes WGFD Hunt Areas 8, 9, 10, and 23 (Beecham et al. 2007).

The population objective for this herd is 1,350 sheep. After a disease-related die-off in 1991, the population has yet to recover and has been in a decline for the past 20 years. Current population estimate is about 634 sheep (WGFD 2010c). In 2009, the lamb:ewe ratio of 30:100 was the highest observed in the past 20 years (WGFD 2009b). In 2010, the ratio was 21:100 lamb:ewes. The ram:ewe ratio for this herd has been more stable. In 2010, the ratio was 30:100, below the 2005 to 2009 average of 35:100 (WGFD 2010c).

It is suggested that the high concentration of wintering sheep contributed to the severity and lasting impacts of the pneumonia outbreak in 1991. As a result, it's been suggested that the Whiskey Mountain Bighorn Sheep Technical Committee review the population objective for this herd to try to avoid the scenario that occurred in 1991 (WGFD 2009b).

In 2010, WGFD personnel spent a significant amount of time observing sheep in early fall as they arrived on winter range. Many lambs were observed coughing violently and showing symptoms of pneumonia. Eleven sheep were euthanized throughout the fall and examined at the state vet lab to document the presence of disease. Examinations revealed *Mycoplasma ovipneumoniae* in all the sheep that had been seen coughing violently. It appears likely persistent, low, annual recruitment in this population can be traced to chronic bacterial infection resulting in significant lamb mortality as sheep migrate onto winter range in the fall. Despite low recruitment, the population is declining very slowly and it appears a small increase in lamb recruitment will stabilize this population. Unfortunately, managers do not have any effective tools to mitigate the persistent presence of bacterial pneumonia that is impacting lambs annually (WGFD 2010b).

No domestic sheep grazing occurs within this herd unit. Closest domestic sheep/goat grazing on public lands to the Whiskey Mountain Herd is approximately 9.7 kilometers (6 miles) west on the Bridger-Teton National Forest. Four domestic sheep that strayed onto core native bighorn sheep habitat on the Bridger-Teton National Forest were removed (shot) in Hunt Area 8 due to concerns over disease transmission (WGFD, personal communication 2012b). Closest domestic sheep/goat grazing on the Shoshone is approximately 80.5 kilometers (50 miles) southeast of the Whiskey Mountain Herd (Wyoming: Domestic Sheep and Bighorn Sheep Distribution 2011).

Pack goat use occurs within occupied habitat of this core native herd. The only pack goat outfitter to operate in this area was bought out in 2007.

Trout Peak Bighorn Sheep Herd

This core native herd occupies portions of the Shoshone within the Absaroka Mountain Range. Sheep move between this herd unit and Yellowstone National Park (Beecham et al. 2007). This herd includes WGFD Hunt Area 2.

The population objective for the Trout Peak herd is 750. The present population is estimated to be about 650 sheep (WGFD 2010b). The lamb:ewe ratios were average for this herd in 2007 (30:100) and 2009 (29:100), but were low in 2008 (19:100). The ram:ewe ratios were average for this herd in 2007 (30:100) and 2009 (33:100), but were substantially higher in 2008 (65:100) (WGFD 2009a). No ratio data exist for 2010. No domestic sheep grazing occurs within this herd unit. Closest domestic sheep/goat grazing on public lands to the Trout Peak Herd is approximately 19.3 kilometers (12 miles) east on BLM lands. Closest domestic sheep/goat grazing on the Shoshone is approximately 220.8 kilometers (138 miles) south of the Trout Peak Herd (Wyoming: Domestic Sheep and Bighorn Sheep Distribution 2011).

No pack goat use occurs within this core native herd range.

Wapiti Ridge Bighorn Sheep Herd

This core native herd occupies portions of the Shoshone and Bridger-Teton National Forests within the Absaroka Mountain Range. Sheep move between this herd unit and Yellowstone National Park (Beecham et al. 2007). This herd includes WGFD Hunt Area 3.

The population objective for the Wapiti Ridge herd is 1,000 sheep with the present population about the same (WGFD 2010b). In 2010, the lamb:ewe ratio was 22:100 which is below the 2000 to 2009 average of 30:100. The ram:ewe ratios were average in 2008 (40:100), but were slightly below average (38:100) in 2009 and 2010 at 32:100 rams:ewes (WGFD 2009a, WGFD 2010b). No domestic sheep grazing occurs within this herd unit. Closest domestic sheep/goat grazing on public lands to the Wapiti Ridge Herd is approximately 29.0 kilometers (18 miles) east on BLM

lands. Closest domestic sheep/goat grazing on the Shoshone is approximately 179.2 kilometers (112 miles) south of the Wapiti Ridge Herd (Wyoming: Domestic Sheep and Bighorn Sheep Distribution 2011).

No pack goat use occurs within this core native herd range.

Clarks Fork Bighorn Sheep Herd

This core native herd occupies portions of the Shoshone and the Gallatin and Custer National Forests in Montana. They range across the Absaroka Mountain Range and the Beartooth Plateau. Sheep from this herd, primarily rams, move in and out of Yellowstone National Park. This herd includes WGFD Hunt Area 1 (Beecham et al. 2007).

The population objective for the Clarks Fork herd is 500 with the present population about the same (WGFD 2010b). The lamb:ewe ratio of 32:100 in 2009, was one of the lowest recorded for this herd. This may have been caused by the cool, wet conditions during the lambing season in 2009. The ram:ewe ratio of 42:100 was lower than recent surveys in 2005 and 2006, but still within the range seen from 2003 to 2006 (WGFD 2009a). No ratio data exist for 2010. No domestic sheep grazing occurs within this herd unit. Closest domestic sheep/goat grazing on public lands to the Clarks Fork Herd is approximately 20.9 kilometers (13 miles) east on BLM lands. Closest domestic sheep/goat grazing on the Shoshone is approximately 240.0 kilometers (150 miles) south of the Clarks Fork Herd (Wyoming: Domestic Sheep and Bighorn Sheep Distribution 2011).

No pack goat use occurs within this core native herd range.

Temple Peak Bighorn Sheep Herd

This cooperative review herd is an indigenous population of the Bridger-Teton and Shoshone National Forests. This herd currently occupies a very small portion of the Shoshone along the Lander Front in the southern end of the Wind River Range. The distribution of bighorns with this unit is scattered, with known wintering areas in the North Fork of the Popo Agie River, Sinks Canyon, and the Little Popo Agie River. This herd includes WGFD Hunt Area 11 (Beecham et al. 2007). This herd no longer has a hunt area assigned to it and is not discussed in the WGFD 2010 Annual Big Game Herd Unit Reports.

This herd experienced an all-age pneumonia die-off in 1992, and has never recovered (WGFD 2006). The current population is suspected to be about 25 sheep. The population objective is 250 sheep. Singer et al. (2001) identified bighorn sheep populations that fall below 30 sheep as “quasi-extirpation” meaning that the population is unlikely to ever recover. This quasi-extirpation herd is likely to eventually go extinct. Due to the low population, no population data is currently being collected by the WGFD.

Domestic sheep grazing occurs on both the Shoshone and Bridger-Teton National Forests within this herd’s historic summer range, but not within currently occupied herd range. Suitable bighorn sheep habitat within these domestic sheep allotments on the Shoshone is very limited as a vast majority of the land is forested and within occupied habitat of gray wolves. In addition, a large portion of the land between these allotments and the bighorn sheep occupied habitat is forested. This herd’s current occupied range is very confined, suggesting that they no longer are a migratory herd or have little, if any interchange with bighorns in the Whiskey Mountain or Wind River Indian Reservation populations (Beecham et al. 2007).

Closest domestic sheep/goat grazing on public lands to the Temple Peak Herd is approximately 9.7 kilometers (6 miles) east on BLM lands. Closest domestic sheep/goat grazing on the Shoshone is approximately 28.9 kilometers (18 miles) southeast of the Temple Peak Herd (Wyoming: Domestic Sheep and Bighorn Sheep Distribution 2011). Closest domestic sheep/goat grazing on the Bridger-Teton NF to the Temple Peak Herd is approximately 3.2 kilometers (2 miles) west. To reduce the risk of transmission, at least one bighorn sheep ram was removed after it made a foray onto private land.

Pack goat use occurs within occupied habitat of this cooperative review herd. The only pack goat outfitter to operate in this area was bought out in 2007.

Recent population trends for the core bighorn sheep herds have been fairly steady. The Whiskey Mountain herd appears to have stabilized since the last pneumonia caused die-off that started in the 1990s (Figure BE- 4).

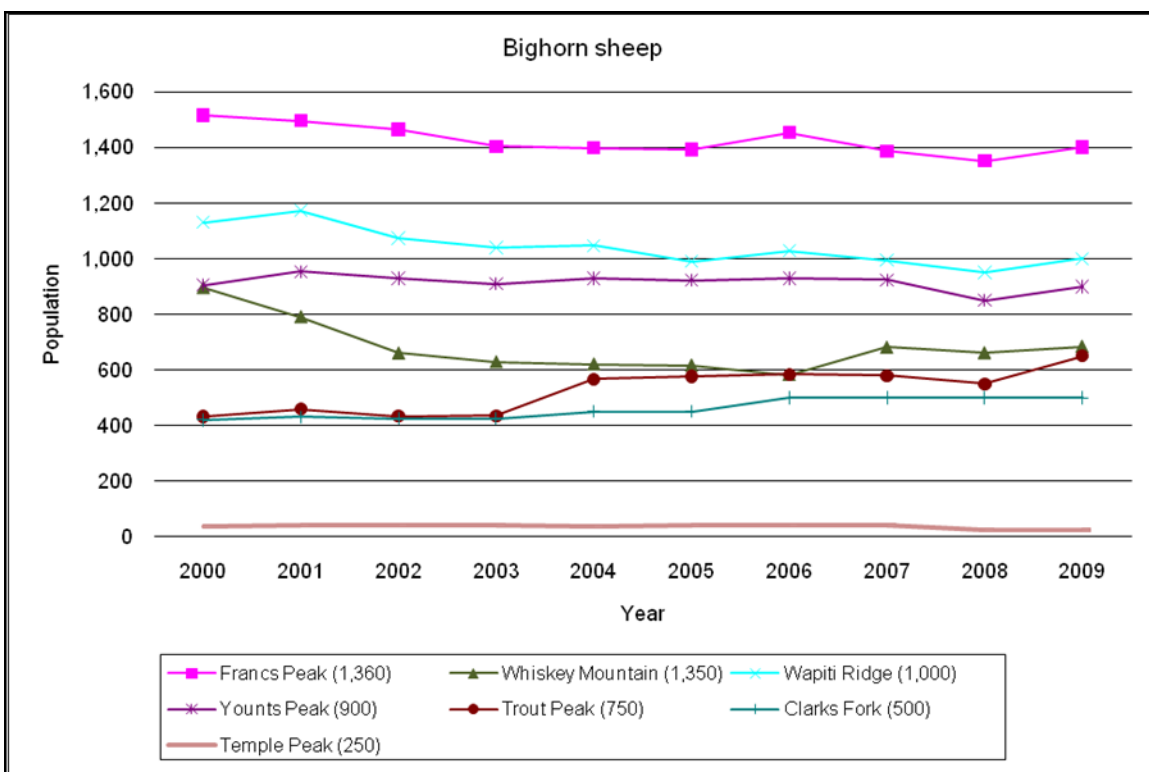


Figure BE- 4 Population trends for bighorn sheep herd units that encompass Shoshone National Forest

Habitat Distribution and Condition on the Shoshone

Habitat for bighorn sheep is abundant on the Shoshone. There is about 819,430 acres of grass/forb/sedge meadow habitat and about 328,170 acres of potential escape cover (rock). Additional habitat may be available in some sagebrush cover types at lower elevations on winter range. Crucial bighorn sheep winter range is the most important habitat on the Shoshone (Figure BE- 5). The Shoshone contains about 663,320 acres of crucial winter range.

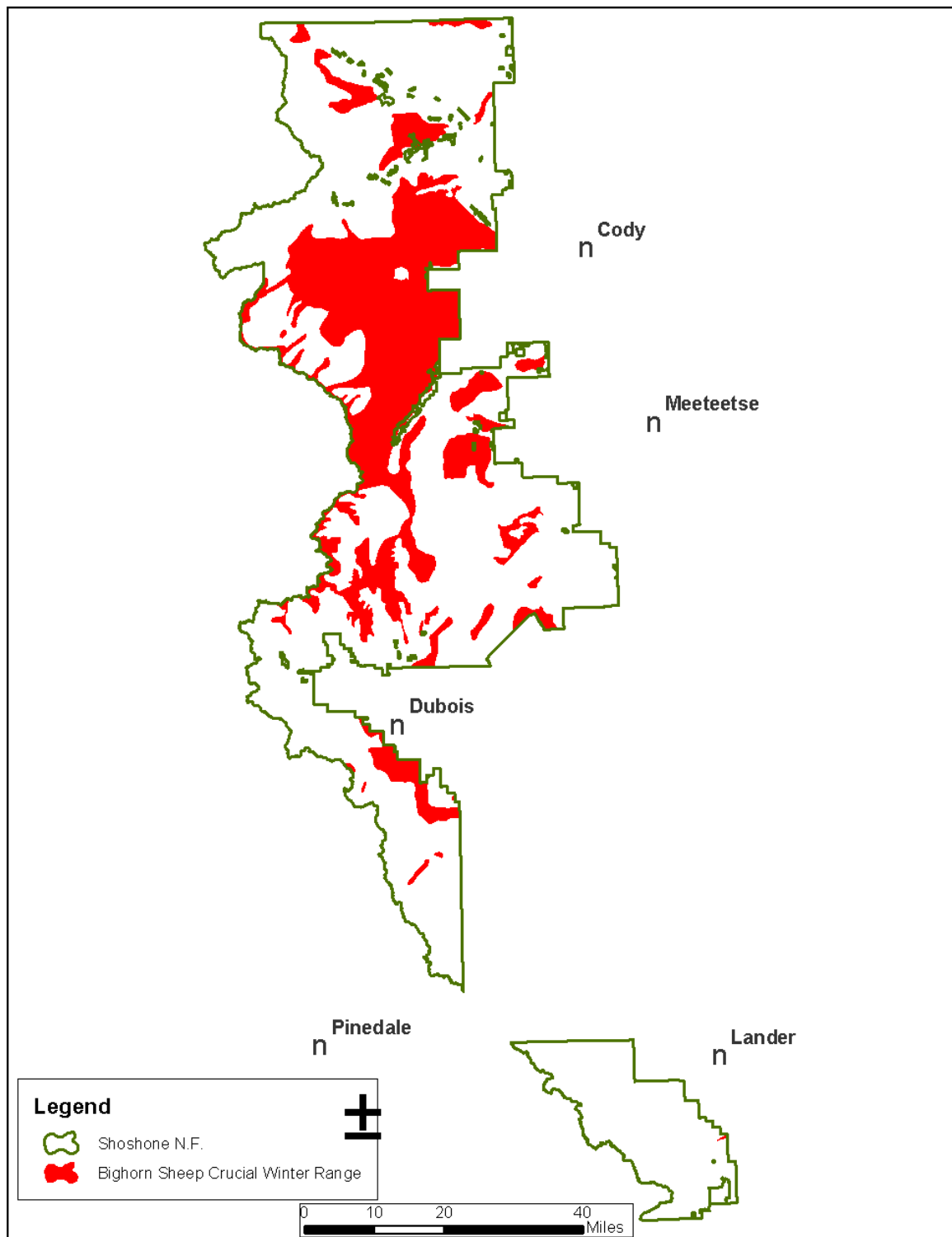


Figure BE- 5 Bighorn sheep crucial winter range on the Shoshone National Forest

In recent years, the Shoshone has experienced large wildfires. About 115,000 acres have burned in the last 5 years and about 161,500 acres in the last 10 years (USFS 2012). Wildfires create

ideal seasonal habitat for bighorns and help to reduce conifer and shrub encroachment within their preferred habitat.

No domestic sheep grazing occurs within or near occupied core bighorn sheep habitat on the Shoshone. The closest core herd, Whiskey Mountain, is about 80 kilometers from the domestic sheep allotments on the southern end of the Forest. There currently is recreational goat pack use within this herd's occupied habitat.

Domestic sheep grazing does occur within about 28.9 kilometers of the remnant Temple Peak herd on the Shoshone. These sheep allotments are mostly forested, so they provide very little potential habitat for bighorns. This results in a low likelihood that foraging bighorns would utilize these allotments.

Although scientific literature is lacking specifically for the risk of disease transmission between pack goats and bighorn sheep, some information is available for domestic goats and bighorn sheep (Rudolph et al. 2003, Foreyt et al. 2009). Until further scientific information is available to prove otherwise, the risk to bighorn sheep is far too great to allow pack goat use within occupied core bighorn sheep habitat. Even one disease transmission event could be catastrophic to a core bighorn sheep herd. (See Risk Analysis of Disease Transmission Between Domestic Sheep and Goats and Rocky Mountain Bighorn Sheep, Shoshone National Forest 2012.)

Risk Factors

The primary risk factors from forest management are domestic sheep grazing, recreational goat-packing, human disturbance during critical time periods (winter), and fire suppression.

Habitat and Population Management Considerations

Maintaining diverse and productive seasonal habitats away from domestic sheep and goats would be the most important forest management emphasis for bighorn sheep.

Limiting human access to bighorn sheep wintering areas also would be important to reduce potential disturbance during this critical time period.

Conservation Measures

In order to provide management for bighorn sheep and to maintain or improve their potential distribution on the Shoshone, the following conservation measures were developed for incorporation into Forest Plan goals, objectives, standards and guidelines. Incorporating conservation measures to maintain and improve habitat for bighorn sheep and reduce potential for disease transmission between domestic goats and bighorns results in an overall low viability risk for core bighorn sheep herds on the Shoshone. The Temple Peak herd will continue to be managed within the "Cooperative Review Area" as a remnant herd. Any change in management of this herd would be cooperatively agreed upon (Wyoming State-wide Bighorn/Domestic Sheep Interaction Working Group 2004a).

Conservation measures summarized include:

- 1) Close all occupied core native bighorn sheep habitat and the area within 26 kilometers of the occupied core native habitat to pack goat use (Figure BE- 6). This is needed to protect core native bighorn sheep herds from the potential for contact with pack goats. The closure for the 26-kilometer buffer is to protect foraging bighorn sheep from coming into contact with pack goats. This measure effectively closes the

entire Shoshone National Forest., except the Washakie Ranger District to pack goat use.

- 2) Coordinate with the WGFD to seasonally close motorized access to crucial bighorn sheep winter range during critical time periods.
- 3) Management activities that disturb wintering bighorn sheep should be conducted outside of the critical time period except when the project is designed to maintain or improve crucial winter range conditions (i.e., prescribed fire).
- 4) Utilize prescribed fire and mechanical treatments to maintain and improve bighorn sheep seasonal ranges.
- 5) Allow for wildland fire use, where appropriate, to maintain and improve bighorn sheep seasonal ranges.

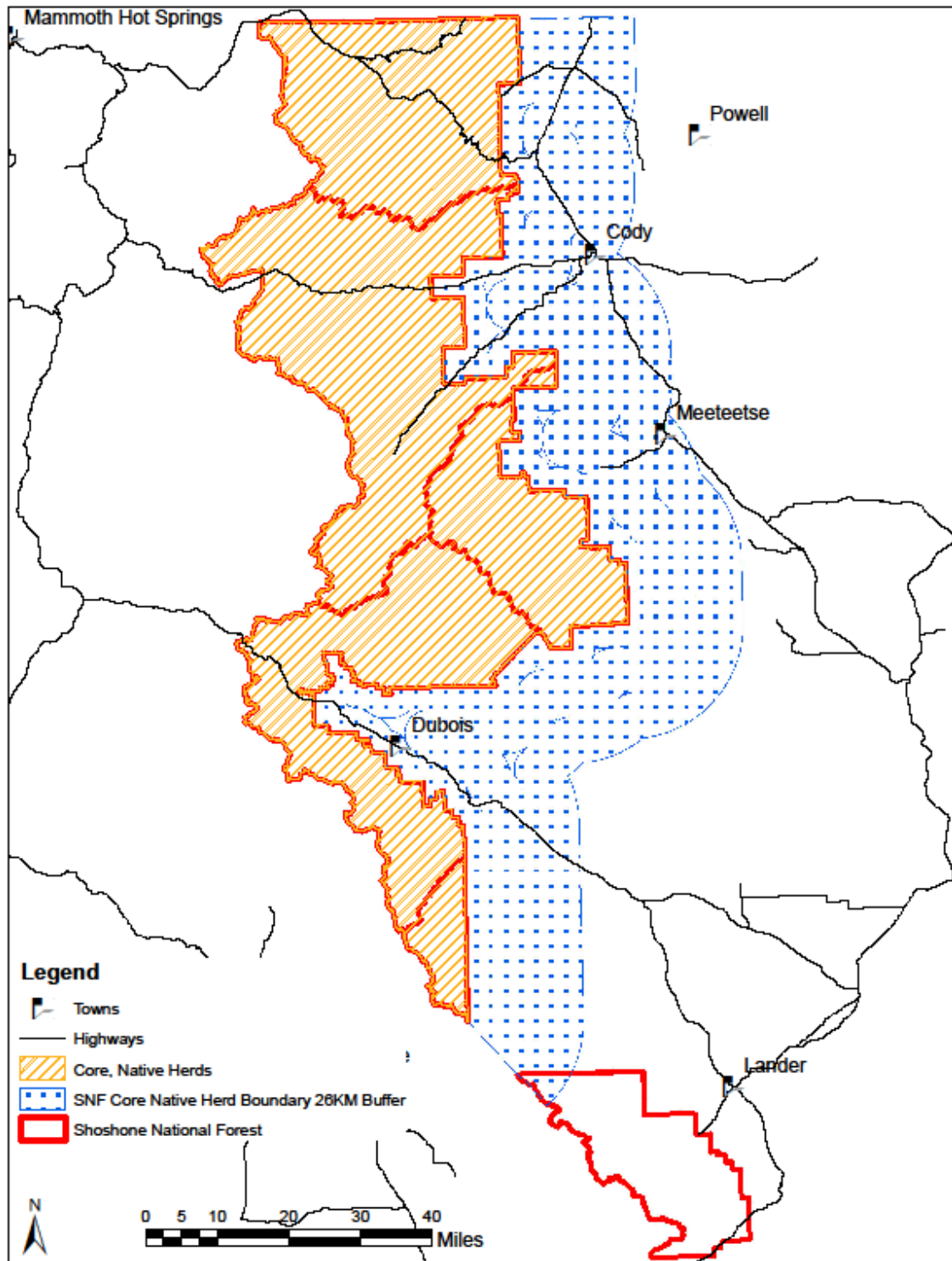


Figure BE- 6 Domestic sheep and goat (including pack goat) closure in core native bighorn sheep range (with a 26-kilometer buffer)

Monitoring Considerations

The WGFD annually monitors bighorn sheep populations. The Shoshone will continue to rely on their data.

Effects Analysis: Plan revision activities that could potentially influence the Rocky Mountain bighorn sheep primarily involve range management activities (i.e., domestic sheep grazing), recreational pack goat use and wildlife management activities (i.e., big game winter range improvements). Differences in projected outputs by alternative for these activities are displayed in Table BE- 11.

Table BE- 11 Activities and projected outputs that could potentially influence the Rocky Mountain bighorn sheep, by alternative

	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Livestock Grazing						
Permitted AUMs (Domestic Sheep only)	408	408	408	408	408	408
Suitable Acres (Total)	15,780	15,780	15,780	15,780	15,780	15,780
Domestic Pack Goat Use	No Permitted domestic sheep and a Temporary Closure for goats (including pack goats) in Core Native BHS Habitat on Clarks Fork, Wapiti, Greybull and Wind River RD	No domestic goats (including pack goats) in Core Native BHS Habitat. Livestock allotments closed to domestic sheep grazing in Core Native BHS habitat.	No domestic goats (including pack goats) on entire SNF. Includes Core Native and Cooperative Review BHS Habitat. Livestock allotments closed to domestic sheep grazing in Core Native BHS habitat	No domestic goats (including pack goats) in Core Native BHS habitat. Livestock allotments closed to domestic sheep grazing in Core Native BHS habitat.	Domestic goats (including pack goats) allowed on entire SNF. Livestock allotments closed to domestic sheep grazing in Core Native BHS habitat.	Domestic goats (including pack goats) allowed on entire SNF. Livestock allotments closed to domestic sheep grazing in Core Native BHS habitat

Direct and Indirect Effects

Alternative A: No action

As displayed in Table BE- 11, alternative A and all action alternatives continue to allocate allotments to domestic sheep grazing, but it is very limited. Alternative A maintains the same permitted numbers and area as alternatives B, C, and D currently set at 456 AUMs and 16,637 acres. There is no overlap between domestic sheep allotments and core native bighorn sheep habitat. Alternative A would allow a temporary closure to domestic sheep and goat use on four of the five ranger districts to expire, increasing the potential risk of disease transmission to core native bighorn sheep. Although there is no documented case of disease transmittals from domestic

sheep and goats to bighorns on the Shoshone, it is possible that a risk would remain for such an event.

Wildlife habitat management to improve big game winter range is projected to occur on 2,000 acres during the life of the Plan revision. This projection includes elk and other big game species as well as potential projects for bighorn sheep. Benefits can be expected on a site-specific basis.

Action Alternatives: Alternatives B-F

As displayed in Table BE- 11, alternatives B, C, and D maintain the same permitted numbers and area for domestic sheep as alternative A, currently set at 456 AUMs and 16,637 acres. There is no overlap between domestic sheep allotments and core native bighorn sheep habitat. Alternatives B, C, and D would restrict domestic sheep and goat use (including pack goats) in core native bighorn sheep habitat. Although the risk of future contact between domestics and bighorn would not be completely eliminated, these alternatives reduce the potential for a disease transmittal.

Alternatives E and F increase the permitted numbers of domestic sheep and area to 548 AUMs and 16,637 acres and 1,283 AUMs and 25,841 acres, respectively. Alternatives E and F allows no overlap between domestic sheep allotments and core native bighorn sheep habitat; however, both alternatives allow goat use (including pack goats) in core native bighorn sheep habitat, increasing the potential risk of disease transmission to core native bighorn sheep. Although there is no documented case of disease transmittals from domestic sheep and goats to bighorns on the Shoshone, it is possible that a risk would remain for such an event.

As in alternative A, wildlife habitat management to improve big game winter range is projected to occur on 2,000 acres during the life of the Plan revision. This projection includes elk and other big game species as well as potential projects for bighorn sheep. Benefits can be expected on a site-specific basis.

Cumulative Effects

Both domestic and bighorn sheep have used the Shoshone for several decades. Currently, there are no documented cases of disease transmittals from domestic sheep or goats to bighorns on the planning area. Management of bighorn sheep and domestic sheep and goats (including pack goats) to avoid physical interactions is often complex. It is important that separation of the three species is maintained at all times; however, the distance needed to attain this can be different in each situation, and collaboration between all parties is needed to achieve this. Currently, the Shoshone is working with other State, Federal, and local partners (State-wide Bighorn Sheep/Domestic Sheep Interaction Working group) to better identify where bighorns occur, where they wander, and how they might interact with other herds and domestics. In managing both domestic sheep and goats and bighorns, the Shoshone is using a nationally recognized collaborative process for resolving bighorn/domestic sheep management conflicts. The approach outlined in the process has been incorporated into the management of domestics and bighorn sheep through the Plan design criteria and Plan components. It is anticipated that this approach will help Forest Service range and wildlife specialists work with interested individuals and organizations to develop site-specific solutions to potential conflicts amongst the species. This effort is expected to help reduce potential cumulative effects to bighorn sheep on the Shoshone.

Determination:

Based on this analysis, it is determined that Plan revision alternatives A, E, and F “**may adversely impact individuals (bighorn sheep), but would not likely result in a loss of viability on the Planning Area, nor cause a trend to federal listing or a loss of species**

viability rangewide.” Alternatives B, C, and D could be expected to provide a “**Beneficial Impact**” to the species. The rationale for this determination is as follows:

- Ranges of bighorn and domestic goats (including pack goats) overlap on the Shoshone, therefore, a risk of disease transmittal occurs in alternatives A, E, and F.
- To date, there is no documented case of disease transmittals from domestics to bighorns on the Shoshone. However, there is no known “safe distance” between the three species so the risk of a future transmittal cannot be discounted. (See Risk Analysis of Disease Transmission Between Domestic Sheep and Goats and Rocky Mountain Bighorn Sheep, Shoshone National Forest 2012.)
- Alternatives B, C, and D include similar conservation measures to reduce the risk of contact and disease transmittal.

6.4 Grassland/sagebrush birds

Brewer’s sparrow (Spizella breweri) and Sage sparrow (Amphispiza belli)

History, Status, and Distribution on the Shoshone

These two species are grouped into one assessment as they occupy similar sagebrush steppe habitat and are subject to similar threats. Historical populations, distribution, or abundance are unknown for either species on the Shoshone.

Brewer’s sparrow is categorized as G5/S5, while the sage sparrow is categorized as G5/S3 species through the natural heritage program ranking. They are also ranked as level I priority species (conservation action) by Wyoming Partners in Flight for shrub-steppe habitat, and are Forest Service R2 sensitive species.

Nests for both species are typically constructed in the bottom portion of live sagebrush plants, typically in the taller shrubs. Both sparrows winter in the southwestern United States and north-central Mexico. They do not appear to have elevation limits in their breeding range.

Brewer’s sparrows are well distributed within the Great Basin and other sagebrush habitats in northwestern North America. They breed throughout Wyoming (Rotenberry et al. 1999). They likely occur Forest-wide within suitable habitat based on recent surveys by the Rocky Mountain Bird Observatory from 2002 to 2008 (Hanni et al. 2009). From 2002 to 2009, the Rocky Mountain Bird Observatory detected 640 total Brewer’s sparrows (Hanni et al. 2009, Rehm-Lorber et al. 2010). There are currently no known population estimates or trends for the species on the Shoshone. At the State level, Breeding Bird Surveys (BBS) indicate a slight declining trend (- 0.7), but the trend is not significant ($p = 0.37$) (WGFD 2010).

Sage sparrows are distributed across the Great Basin and other sagebrush habitats in the western United States. They primarily breed in portions of central and western Wyoming (Martin et al. 1998). Based on Rocky Mountain Bird Observatory surveys, sage sparrows are rare on the Shoshone. Rocky Mountain Bird Observatory surveys only detected 3 birds from 2002 to 2009 (1 in 2007, 2 in 2009) (Hanni et al. 2009, Rehm-Lorber et al. 2010). There are currently no known population estimates or trends for the species on the Shoshone. At the State level, BBS indicate a slightly increasing trend (0.8), but the trend is not significant ($p = 0.72$) (WGFD 2010).

With fluctuations in natural ranges of habitat, it is difficult to determine whether populations of these species on the Shoshone are similar to historic levels. Regional declines reported in BBS results for most of the West indicate they are not (Paige and Ritter 1999), and significant acreages of sagebrush habitat have been lost throughout the West due to European settlement influences, such as conversion to agriculture, urban development, or losses due to cheatgrass invasion. These changes are likely having an effect on Brewer's and sage sparrow populations, though these effects currently are not occurring to a significant extent on the Shoshone as compared to surrounding lands.

Habitat Distribution and Condition on the Shoshone

Both sparrows depend on sagebrush habitats, tending toward mature stands and larger stand sizes, which make them sensitive to habitat fragmentation (Paige and Ritter 1999). Food sources are primarily insects in the summer, with seeds of grasses and shrubs a secondary source. Across the Shoshone there are about 38,784 acres of sagebrush, representing 2.0 percent of the Forest (USFS 2012b). This acreage includes all types of sagebrush. Mountain big sagebrush dominates the montane shrublands throughout the Absaroka Mountains. Arid low-elevation sagebrush occurs on the eastern margins of the Shoshone. The most extensive stands are found in the North and South Fork Shoshone River valleys. On the Washakie Ranger District, mountain big sagebrush is mixed with bitterbrush and mountain snowberry. Additional sagebrush habitat likely occurs within some stands classified as grassland on the Forest.

In general, most of the sagebrush stands on the Shoshone are likely in a mature condition. This is largely due to fire suppression, especially at the lower elevations. Fire suppression can cause increases in shrub cover and tree encroachment, but on the Shoshone the change is not large enough to be outside of the historic range of variability at the stand or landscape level (low confidence) (Meyers et al. 2006). There appears to be adequate habitat to support viable populations of these species on the Forest.

Roads on the Shoshone have likely fragmented some sagebrush stands. To what extent is currently unknown.

Livestock grazing can also influence sagebrush ecosystems, though typically resulting in an increase of mature sagebrush due to the removal of understory herbaceous vegetation. Trampling of nests is not thought to be of concern, as both sparrows nest in the canopy of sagebrush. Nest parasitism from cowbirds may have an impact, as cowbirds tend to follow livestock herds (Paige and Ritter 1999). However, both rotational grazing systems and the later turn-out date of most livestock operations likely provide adequate areas of little influence from this effect. Livestock may also increase the risk for the introduction of non-native weeds.

Non-native weeds are currently limited to localized concentrations and are primarily located along major travel corridors (roads and trails). Similarly, cheatgrass has yet to invade large or broad proportions of the Shoshone. However, the threat of habitat loss remains high. Cheatgrass alters the fire regime and increases the probability for more frequent fires. This reduces the chance for sagebrush and native bunchgrasses to get re-established following a fire.

Risk Factors

Primary risk factors from forest management include: habitat fragmentation, prescribed fire, livestock grazing, and invasion by non-native weeds.

Climate change has the potential to increase the risk of non-native weed invasion and could result in more frequent stand-replacement fires.

Habitat and Population Management Considerations

Retention of stands of mature sagebrush habitat at a watershed scale would provide for ensured habitat for populations of these species. Although to what level is unknown, it is assumed that within a range of what likely historically occurred is reasonable. This would also facilitate management toward ensuring sustainable and diverse habitat conditions. If sagebrush was managed only for mature high canopy cover stands, the habitat is more at risk for losses due to wildfire, and do not provide the needed diversity of grasses/forbs for other species. Mosaics created by prescribed burning may be most beneficial, though this could also be accomplished through other methods.

Paige and Ritter (1999) recommend small-scale, patchy prescribed burns, conducted in the late spring or fall, for habitat diversity considerations. The guidelines developed for vegetation management in sage grouse habitat (WGFD 2003) would likely be adequate for these species.

As mentioned previously, activities that have potential to expand cheatgrass or other non-native weeds should be closely monitored to ensure no further loss of habitat. Climate change has the potential to increase the spread of invasive weeds into sagebrush and alter fire regimes.

Roads can have negative effects on these species. Roads can reduce patch size, increase the potential for displacement by other species more adapted to roads and edge (horned larks), and increase the risk for introduction of non-native weeds. Additional road construction in large stands of sagebrush should be minimized.

Conservation Measures

For continued and improved management for these species and their habitat, the following conservation measures were developed for incorporation into Forest Plan goals, objectives, standards and guidelines. Inclusion of these measures would continue to provide adequate habitat for these species and other sagebrush associated species resulting in a low viability risk to these species. Birds in a Sagebrush Sea (Paige and Ritter 1999), Brewer's Sparrow (*Spizella breweri*): A Technical Conservation Assessment (Holmes et al. 2005b), Sage Sparrow (*Amphispiza belli*): A Technical Conservation Assessment (Holmes et al. 2005a), and the Wyoming Greater Sage-Grouse Conservation Plan (WGFD 2003) were reviewed to determine habitat needs.

Conservation measures summarized include:

- 1) Prevent or reduce the risk for large stand-replacement fires in sagebrush habitat. Conduct prescribed burns that are small and patchy and maintain habitat diversity. Retain areas of large expanses of sagebrush habitat (minimize edge created).
- 2) To reduce the risk of further spread, prescribed burns should not occur in areas with cheat grass and other non-native weeds.
- 3) Maintain native grasses and forbs through proper grazing limitations. Use rotational grazing systems to provide rest and areas with reduced potential for cowbird parasitism. Provide for retention of about 50 percent of the current year's growth of herbaceous vegetation for nesting cover in the following season.

- 4) Consider resting burned areas from grazing to provide adequate regeneration of native vegetation.
- 5) Prioritize and aggressively treat invasive weeds to prevent additional loss of sagebrush habitats.
- 6) Limit the number of new roads. Reclaim old roads that are not being used. Discourage road construction and other developments where it would reduce sagebrush habitat patch size.
- 7) Retain sagebrush habitat (no type conversions).
- 8) Re-establish sagebrush and native bunch grasses in habitat now dominated by non-native weeds.
- 9) Provide a mosaic of open (5 percent) to moderate (25 percent) shrub canopy cover on the landscape.

Monitoring Considerations

Sparrows can be monitored in conjunction with avian point count surveys, as they are easily detected. About 5 years of data collection would be needed to establish baseline trends. Habitat inventory and monitoring should also be considered in conjunction with population monitoring.

Effects Analysis: Plan revision activities that could potentially influence the Brewer's sparrow primarily involve fuels treatment activities and livestock grazing. Differences in projected outputs by alternative for these activities are displayed in Table BE- 12.

Table BE- 12 Activities and projected outputs that could potentially influence Brewer's sparrow and sage sparrow, by alternative

	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Vegetation Treatment Acres Prescribed Fire(Total)	23,559	23,302	23,299	23,342	22,823	21,910
Grass	909	914	911	912	935	970
Sagebrush	2,729	2,700	2,716	2,711	2,599	2,423
Wildfire Acres	185,152	182,900	184,132	183,703	174,983	161,363
Livestock Grazing						
Permitted AUMs (Cattle only)	55,425	55,425	30,853	55,425	66,509	68,929
Suitable Acres (Total)	292,285	292,285	170,136	292,285	292,285	323,083

*Direct and Indirect Effects***Alternative A: No action**

As displayed in Table BE- 12, alternative A provides for a similar amount of fuels treatment in mixed-shrubland as alternatives B-F. These treatments primarily involve prescribed fire to reduce fuels hazards associated with mature, medium-density shrublands, including sagebrush. Because sagebrush is not a target species for fuels reduction on the planning area, potential impacts to Brewer's and sage sparrows from fuels reduction activities on the Shoshone are expected to be minor, but cannot be completely discounted.

As displayed in Table BE- 12 the permitted amount and area for cattle grazing does not differ among alternatives A, B, and D. These activities are therefore predicted to have potential negative influences on individual breeding pairs of Brewer's and sage sparrows where activities and habitat overlap. On National Forest System land, however, these activities are expected to be minor because of the small amount of acreage involved and the conservation measures developed to minimize potential impacts. These conservation measures are similar across alternatives.

Action Alternatives: Alternatives B-F

All alternatives provide for a similar amount of fuels treatment in mixed-shrubland, with a slight decrease in alternative E and greater decrease in alternative F. Because sagebrush is not a target species for fuels reduction of National Forest System land, potential influences on Brewer's and sage sparrows and other sage-associated species are expected to be similar to Alternative A.

As displayed in Table BE- 12, alternatives B and D provide for the same amount of livestock grazing as alternative A. There is a slight reduction in AUMs and area in alternative C, and a slight increase in AUMs in alternative D. The decrease in grazing area and stocking rates in alternative C may provide some secondary benefits to species such as the Brewer's and sage sparrow, while the increase in alternative D may be associated with a higher degree of habitat impacts to the species. Alternatives E and F maintain the highest permitted forage allocation to livestock and are therefore assumed to have a potential for negative impacts to Brewer's and sage sparrow habitat if the activities overlap. Overall, however, potential impacts are expected to be similar and based on site-specific areas where conservation measures are available to alleviate identified problems. The conservation measures are similar across all alternatives.

Cumulative Effects

There is little to no management activity that occurs in sagebrush on the Shoshone, except for grazing. Although sagebrush has a limited distribution across the forest, livestock grazing effects have occurred where grazing activities occur within active allotments. Fuels management may occur in areas, which include small stands of sagebrush but are otherwise dominated by other vegetation types. Management actions are conducted in sagebrush grasslands on the adjacent BLM lands where the objectives include opening up decadent stands to improve the grass/forb understory, to increase the age class diversity, to improve forage conditions, and to improve habitat. Overall, little influence or cumulative effects on sagebrush-associated species is expected on the Shoshone as a whole because of limited activities in this habitat type.

Determination

All Plan revision alternatives, including alternative A, **“may adversely impact individuals (Brewer's sparrows and sage sparrows), but would not likely result in a loss of viability on**

the Planning Area, nor cause a trend to federal listing or a loss of species viability rangewide.” The rationale for this determination follows:

- The primary threats to Brewer’s and sage sparrow populations associated with the Shoshone involve habitat conversions and activities on private lands.
- Some Plan revision activities could overlap occupied Brewer’s and sage sparrow habitat and have negative influences on the species.
- The Plan revision has incorporated guidance provided to maintain and improve sagebrush habitat conditions.

Ferruginous hawk (Buteo regalis)

History, Status, and Distribution on the Shoshone

The ferruginous hawk has a natural heritage ranking of G4/S4B/S5N. There are two state rankings for breeding and non-breeding (winter) birds. Historical populations, distribution, or abundance are unknown on the Shoshone.

Ferruginous hawks are found in arid and open landscapes in western North America from southern Canada, through the western Great Plains, and Great Basin, south to Arizona and New Mexico (Bechard and Schmutz 1995). Ferruginous hawks are considered a common resident in Wyoming (WGFD 2010). Ferruginous hawks are rare on the Shoshone as habitat is very limited. No known nests occur on the Forest. They probably only occasionally forage on the Shoshone.

The Rocky Mountain Bird Observatory completed bird surveys from 2002 to 2009 on the Shoshone. They detected one hawk in 2007 and one in 2009 (Hanni et al. 2009, Rehm-Lorber et al. 2010). Due to their low occurrence on the Shoshone, no trend data is available. In Wyoming, overall populations are thought to be stable or increasing. Local declines are assumed to have occurred near major disturbances such as urban development, large active surface mines, and intensively developed petroleum fields (Travsky and Beauvais 2005).

Habitat Distribution and Condition on the Shoshone

Ferruginous hawks nest in open flat to rolling terrain dominated by grass and shrubs. They require large tracts of relatively undisturbed rangeland. Nests are located on rock outcrops, on the ground, cutbanks, cliff ledges, or trees (WGFD 2010). This type of habitat is rare on the Shoshone and is most likely to occur in grassland areas along the forest boundary. Based on currently known distribution and distribution modeling (Keinath et al. 2010), ferruginous hawks have a low probability of occurring on most of the Shoshone.

Risk Factors

The primary risk factors from forest management are livestock grazing and fire suppression. Other risk factors include cover type conversion to cropland, urban development, and extensive petroleum field development. These risks are impacting habitat adjacent to the Shoshone.

Habitat and Population Management Considerations

Retention of large blocks of grassland habitat at a watershed scale would provide for ensured habitat for populations of this species. Although to what level is unknown, it is assumed that within a range of what likely historically occurred is reasonable.

The use of prescribed fire and wildfire are important to reduce the impacts from shrub and tree encroachment into grasslands and to create a mosaic of habitats.

Conservation Measures

In order to maintain and improve potential habitat for ferruginous hawks on the Shoshone, the following conservation measures were developed for incorporation into Forest Plan goals, objectives, standards and guidelines. Inclusion of these measures would continue to provide adequate habitat for this species and other grassland associated species, resulting in a low viability risk to these species. These conservation measures would apply to the low-elevation arid grasslands on the Shoshone.

Conservation measures summarized include:

- 1) Allow for wildland fire use, where appropriate, to create a mosaic of habitats and reduce encroachment from shrubs and trees into grasslands.
- 2) Utilize prescribed fire to create a mosaic of habitats and to reduce tree and shrub encroachment.
- 3) Maintain native grasses and forbs through proper grazing limitations. Use rotational grazing systems to provide rest.
- 4) Consider resting burned areas from grazing to provide adequate regeneration of native vegetation.
- 5) Prioritize and aggressively treat invasive weeds to prevent additional loss of grassland habitats.
- 6) Retain grassland habitat (no type conversions).
- 7) Re-establish native bunch grasses in habitat now dominated by non-native weeds.

Monitoring Considerations

Since ferruginous hawks are not currently known to nest on the Shoshone, inventorying potential nesting habitat that occurs on the Forest would be important. This could help to determine if the ferruginous hawk should be retained as a sensitive species on the Shoshone.

Effects Analysis: Plan revision activities that could potentially influence the ferruginous hawk primarily involve motorized and non-motorized recreation, and possibly livestock grazing.

Direct and Indirect Effects

Alternative A: No action

The ferruginous hawk is a migratory species with individuals that occur sporadically during the winter period. No breeding or nesting pairs are known to occur. Potential affects to this species are therefore most likely limited to possible disturbances from motorized vehicles or recreational activities.

Action Alternatives: Alternatives B-F

Potential effects from the action alternatives are expected to be similar to no action. Potential effects to this species are expected to be limited to possible disturbances from motorized vehicles or recreational activities on migratory non-breeding individuals.

Cumulative Effects

The ferruginous hawk has suffered habitat loss and negative effects throughout much of its range in the western United States. However, all of the alternatives associated with the Plan revision are expected to have no cumulative effects on this species because the Shoshone does not measurably contribute to the conservation of the species. All individuals are migratory with no important breeding habitats known.

Determination

All Plan revision alternatives, including alternative A, are expected to have **No Impact on the ferruginous hawk or its primary habitat**. The rationale for this determination follows:

- The ferruginous hawk is a migratory species that is not known to breed locally.
- Although localized disturbances may occur to migratory individuals, there is no measurable effect on the reproductive output or overall conservation status of the species

Grasshopper sparrow (Ammodramus savannarum)

History, Status, and Distribution on the Shoshone

Grasshopper sparrows are considered a G4/S4 species by the State Natural Heritage ranking for Wyoming. Historical populations, distribution or abundance are unknown for this species on the Shoshone.

Grasshopper sparrows breed across extreme southern Canada and much of the eastern two-thirds of the United States, with scattered populations in Idaho, Utah, California, and Washington (Vickery 1996). They winter in the southern United States and Mexico. In Wyoming, they breed mostly in the short grass prairies (Slater 2004). The Shoshone contains very little, if any, short grass prairie habitat. The Wyoming Natural Diversity Database (WYNDD) modeled very low probability of grasshopper sparrows occurring on the Shoshone (Keinath et al. 2010).

During surveys on the Shoshone from 2002 to 2008, the Rocky Mountain Bird Observatory detected three birds in 2006 (Hanni et al. 2009). Trend data is not available for grasshopper sparrows on the Shoshone or in Wyoming. This is due to the low occurrence of grasshopper sparrows on survey routes.

Habitat Distribution and Condition on the Shoshone

In Wyoming, grasshopper sparrows are found in mixed and northern shortgrass prairies and open sagebrush grasslands (Slater 2004). They appear to be area-sensitive, thus preferring large unfragmented patches of habitat (Vickery 1996).

There are about 459,000 acres classified as grassland on the Shoshone (USFS 2012b). Grasshopper sparrows are most likely to occur in the lowest elevation arid type grasslands. These grasslands are dominated by bunchgrasses and occur in the South Fork of the Shoshone River drainage and in Sunlight Basin (USFS 2009).

The grassland cover type may be declining relative to sagebrush habitat. This may be due to fire suppression. However, the sagebrush cover type may not be above its historic range of variability (USFS 2012a). Also, in some areas prescribed fire may be reducing the advancement of sagebrush and trees into grassland habitat.

Overgrazing in grasslands is a major threat to grasshopper sparrow habitats. Most grazing causes the vegetation to become too short and open for grasshopper sparrows to utilize (Slater 2004). However, both rotational grazing systems and the later turn-out date of most livestock operations likely provide adequate areas of little influence from this effect. Livestock and other ground disturbing activities may also increase the risk for the introduction of invasive plants.

Risk Factors

The primary risk factors from forest management are livestock grazing, fire suppression and non-native weeds. Other risk factors include cover type conversion to cropland and urban development. Both of these risk factors impact grasshopper sparrow habitat off of the Shoshone.

Habitat and Population Management Considerations

Retention of large blocks of grassland habitat at a watershed scale would provide for ensured habitat for populations of this species. Although to what level is unknown, it is assumed that within a range of what likely historically occurred is reasonable.

The use of prescribed fire and wildfire are important to reduce the impacts from shrub and tree encroachment into grasslands and to create a mosaic of habitats.

Activities that have potential to expand cheatgrass or other non-native weeds should be closely monitored to ensure further loss of habitat does not occur. Climate change has the potential to increase the spread of invasive weeds into grasslands and alter fire regimes.

Conservation Measures

In order to maintain and improve potential habitat for grasshopper sparrows on the Shoshone, the following conservation measures were developed for incorporation into Forest Plan goals, objectives, standards and guidelines. Inclusion of these measures would continue to provide adequate habitat for this species and other grassland associated species resulting in a low viability risk to these species. These conservation measures would apply to the low-elevation arid grasslands on the Forest.

Conservation measures summarized include:

- 1) Allow for wildland fire use, where appropriate, to create a mosaic of habitats and reduce encroachment from shrubs and trees into grasslands.
- 2) Utilize prescribed fire to create a mosaic of habitats and to reduce tree and shrub encroachment.
- 3) To reduce the risk of further spread, prescribed burns should not occur in areas with cheat grass and other non-native weeds.
- 4) Maintain native grasses and forbs through proper grazing limitations. Use rotational grazing systems to provide rest and areas with reduced potential for cowbird parasitism. Provide for retention of about 50 percent of current year's growth of herbaceous vegetation for nesting cover in the following season.
- 5) Consider resting burned areas from grazing to provide adequate regeneration of native vegetation.
- 6) Prioritize and aggressively treat invasive weeds to prevent additional loss of grassland habitats.

- 7) Retain grassland habitat (no type conversions).
- 8) Re-establish native bunch grasses in habitat now dominated by non-native weeds.

Monitoring Considerations

Of most importance for this species would be to attain distribution information for the Shoshone. This could be completed utilizing point count surveys within suitable habitat. Currently, suitable habitat is estimated to only occur in the arid grasslands in the South Fork Shoshone River drainage and Sunlight Basin.

Effects Analysis: Plan revision activities that could potentially influence the grasshopper sparrow primarily involve fire suppression and livestock grazing. Differences in projected outputs by alternative for these activities are displayed in Table BE- 13.

Table BE- 13 Activities and projected outputs that could potentially influence grasshopper sparrow, by alternative

	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Vegetation Treatment Acres Prescribed Fire(Total)	23,559	23,302	23,299	23,342	22,823	21,910
Grass	909	914	911	912	935	970
Sagebrush	2,729	2,700	2,716	2,711	2,599	2,423
Wildfire Acres	185,152	182,900	184,132	183,703	174,983	161,363
Livestock Grazing						
Permitted AUMs (Cattle only)	55,492	55,492	30,992	55,492	57,890	61,092
Suitable Acres (Total)	359,620	359,620	201,020	359,620	359,620	399,600

Direct and Indirect Effects

Alternative A: No action

As displayed in Table BE- 13, alternative A provides for a similar amount of fuels treatment in mixed-shrubland as alternatives B-F. These treatments primarily involve prescribed fire to reduce fuels hazards associated with mature, medium-density shrublands, including sagebrush. Because sagebrush is not a target species for fuels reduction on the planning area, potential impacts to grasshopper sparrows from fuels reduction activities on the Shoshone are expected to be minor, but cannot be completely discounted.

Wildland fire use is not a planned output in any of the alternatives. However, it will be utilized as a tool to allow natural disturbances to occur as opportunities arise. It is estimated that all alternatives may allow from 161,363 to 185,152 acres of wildland fire use. Because sagebrush is not a target species for wildland fire use on the planning area, potential impacts to grasshopper sparrows from this activity on the Shoshone is expected to be minor, but cannot be completely discounted.

Cattle grazing on the Shoshone is likely to overlap potential habitat for the grasshopper sparrow. As displayed in Table BE- 13, the permitted amount and area for cattle grazing does not differ among alternatives A, B, and D. These activities are therefore predicted to have potential negative influences on individual breeding pairs of grasshopper sparrows where activities and habitat overlap. On National Forest System land, however, these activities are expected to be minor because of the small amount of acreage involved and the conservation measures developed to minimize potential impacts. These conservation measures are similar across alternatives.

Action Alternatives: Alternatives B-F

As displayed in Table BE- 13, alternatives B-F provide for a similar amount of fuels treatment in mixed-shrubland, with a slight decrease in alternative E and greater decrease in alternative F. Because sagebrush is not a target species for fuels reduction of National Forest System land, potential influences on grasshopper sparrow and other sage-associated species are expected to be similar to alternative A.

As displayed in Table BE- 13, alternatives B and D provide for the same amount of livestock grazing as alternative A. There is a slight reduction in AUMs and area in alternative C, and a slight increase in AUMs in alternative D. The decrease in grazing area and stocking rates in alternative C may provide some secondary benefits to species such as the grasshopper sparrow, while the increase in alternative D may be associated with a higher degree of habitat impacts to the species. Alternatives E and F maintain the highest permitted forage allocation to livestock and are therefore assumed to have a potential for negative impacts to grasshopper sparrow habitat if the activities overlap. Overall, however, potential impacts are expected to be similar and based on site-specific areas where conservation measures are available to alleviate identified problems. The conservation measures are similar across all alternatives.

Cumulative Effects

There is little to no management activity that occurs in sagebrush on the Shoshone, except for grazing. Although sagebrush has a limited distribution across the forest, livestock grazing effects have occurred where grazing activities occur within active allotments. Fuels management may occur in areas, which include small stands of sagebrush, but otherwise are dominated by other vegetation types. Management actions are conducted in sagebrush grasslands on the adjacent BLM lands where the objectives include opening up decadent stands to improve the grass/forb understory, to increase the age class diversity, to improve forage conditions, and habitat improvement. Overall, little influence or cumulative effects on sagebrush-associated species are expected on the Shoshone as a whole because of limited activities in this habitat type.

Determination

All Plan revision alternatives, including alternative A, **“may adversely impact individuals (grasshopper sparrows), but would not likely result in a loss of viability on the Planning Area, nor cause a trend to federal listing or a loss of species viability rangewide.”** The rationale for this determination follows:

- The primary threats to grasshopper sparrow populations associated with the Shoshone involve habitat conversions and activities on private lands.
- Some Plan revision activities could overlap occupied grasshopper sparrow habitat and have negative influences on the species.
- The Plan revision has incorporated guidance provided to maintain and improve sagebrush habitat conditions.

Greater sage-grouse (Centrocercus urophasianus)

History, Status, and Distribution on the Shoshone

Sage-grouse are categorized as G4/S4 species through the natural heritage program ranking. They are a candidate species for listing under the Endangered Species Act and are a Forest Service R2 sensitive species. Historical populations, distribution, or abundance are unknown for sage-grouse on the Shoshone.

Sage-grouse are well distributed within the Great Basin and the Northern Rocky Mountain regions. Their range has contracted considerably in some areas from historic levels where sagebrush habitat has been lost. In Wyoming, sage-grouse are common because sagebrush habitat is still relatively intact when compared to other states (WGFD 2003). No core habitat for sage-grouse occurs on the Shoshone (Figure BE- 8), but the Forest likely contains some late-summer brood-rearing habitat. Sage-grouse are known to occasionally occur on the Shoshone and are probably an occasional summer resident. There are currently no known population estimates or trends for the species on the Shoshone. The WGFD does track the number of males at leks each year. Within the Bighorn Basin, the number of males at leks has fluctuated (Figure BE- 7).

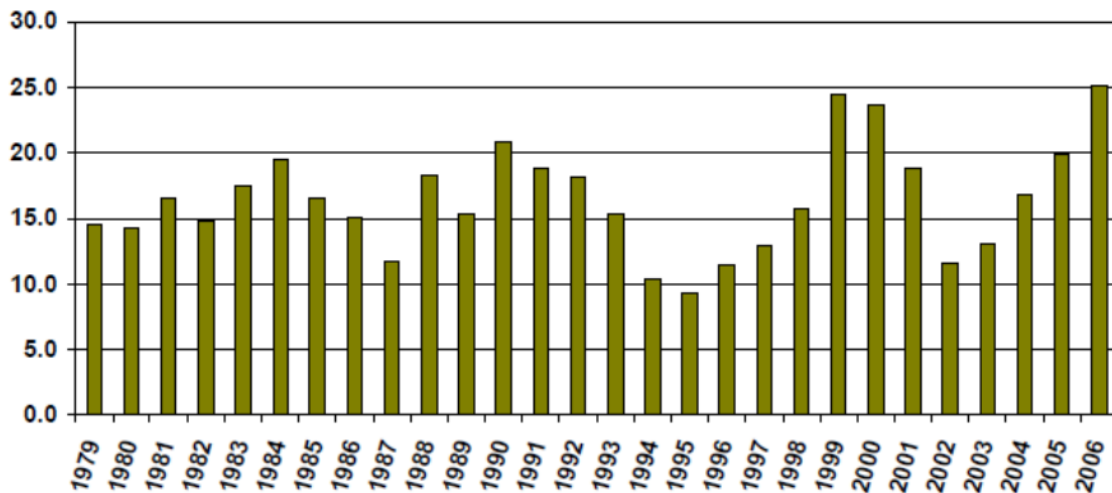


Figure BE- 7 Average maximum number of males per active lek for greater sage-grouse in the Big Horn Basin Conservation Area, 1979 to 2006 (BBSGLWG 2007)

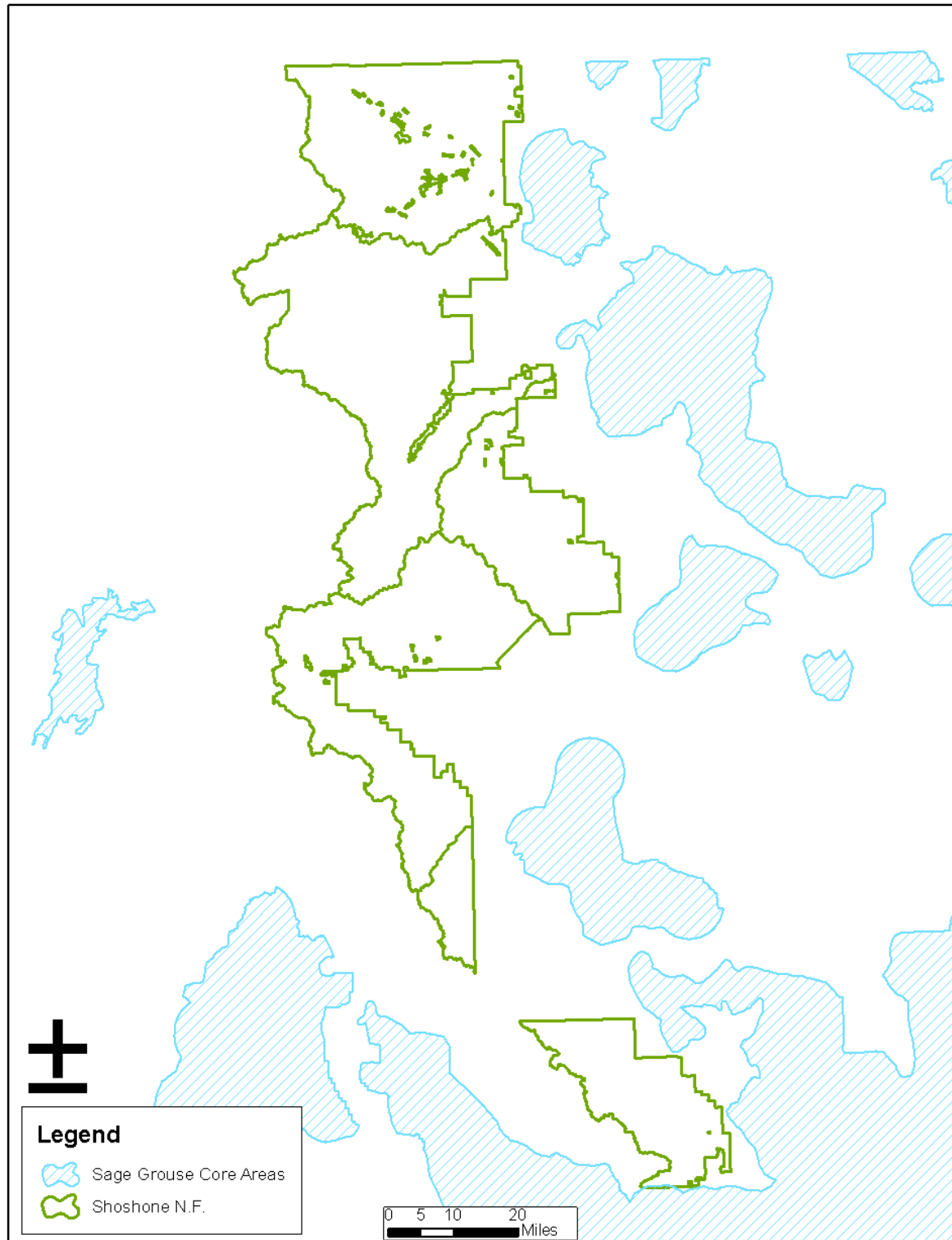


Figure BE- 8 Greater sage-grouse core areas

Habitat Distribution and Condition on the Shoshone

Sage-grouse are a sagebrush obligate species. Suitable habitat consists of plant communities dominated by sagebrush and have a diverse understory of native grasses and forbs (BBSGLWG 2007). Sage-grouse are area-sensitive and thus prefer large blocks of unfragmented habitat (Paige and Ritter 1999). Across the Shoshone there are about 38,784 acres of sagebrush, representing 2.0 percent of the Forest (USFS 2012b). This acreage includes all types of sagebrush. Mountain big sagebrush dominates the montane shrublands throughout the Absaroka Mountains. Arid low-elevation sagebrush occurs on the eastern margins of the Forest. The most extensive of these stands are found in the North and South Fork Shoshone River valleys. On the Washakie Ranger District, mountain big sagebrush is mixed with bitterbrush and mountain snowberry. Additional sagebrush habitat likely occurs on the Shoshone within some stands classified as grassland.

In general, most of the sagebrush stands on the Shoshone are likely in a mature condition. This is largely due to fire suppression, especially at the lower elevations. Fire suppression can cause increases in shrub cover and tree encroachment, but on the Shoshone the change is not large enough to be outside of the historic range of variability at the stand or landscape level (low confidence) (Meyers et al. 2006).

Roads on the Shoshone have likely fragmented some sagebrush stands. To what extent is currently unknown.

Over grazing can also influence sagebrush ecosystems, though typically resulting in an increase of mature sagebrush due to the removal of understory herbaceous vegetation. Livestock may also increase the risk for the introduction of invasive plants.

Non-native weeds are currently limited to localized concentrations and are primarily located along major travel corridors (roads and trails). Similarly, cheatgrass has yet to invade large or broad proportions on the Shoshone. However, the threat of habitat loss remains high. Cheatgrass alters the fire regime and increases the probability for more frequent fires. This reduces the chance for sagebrush and native bunchgrasses to get re-established following a fire.

Risk Factors

Primary risk factors from forest management include: habitat fragmentation, prescribed fire, livestock grazing, and invasion by non-native weeds.

Climate change has the potential to increase the risk of cheatgrass invasion and could result in more frequent stand-replacement fires.

Habitat and Population Management Considerations

Retention of stands of mature sagebrush habitat at a watershed scale would provide for ensured habitat for populations of this species. Although to what level is unknown, it is assumed that within a range of what likely historically occurred is reasonable. This would also facilitate management toward ensuring sustainable and diverse conditions occur. If sagebrush was managed only for mature high canopy cover stands, the habitat is more at risk for losses due to wildfire, and do not provide the needed diversity of grasses/forbs. Mosaics created by prescribed burning may be most beneficial, though this could also be accomplished through other methods.

Paige and Ritter (1999) recommend small-scale, patchy prescribed burns conducted in late spring or fall for habitat diversity considerations.

As mentioned previously, activities that have potential to expand cheatgrass or other non-native weeds should be closely monitored to ensure further loss of habitat does not occur. Climate change may increase the spread of invasive weeds into sagebrush and alter fire regimes.

Roads can have negative effects on this species. Roads can reduce patch size, increase disturbance, and increase the risk for introduction of non-native weeds. Additional road construction in large stands of sagebrush should be minimized.

Conservation Measures

A Candidate Conservation Agreement with Assurances is being prepared for the greater sage-grouse in Wyoming. When it is finalized, the applicable conservation measures in the agreement will be incorporated into the Shoshone's revised forest plan. Until that time and for continued and improved management for sage-grouse and their habitat, the following conservation measures were developed for incorporation into Forest Plan goals, objectives, standards and guidelines. Birds in a Sagebrush Sea (Paige and Ritter 1999), Brewer's Sparrow (*Spizella breweri*): A Technical Conservation Assessment (Holmes et al. 2005b), Sage Sparrow (*Amphispiza belli*): A Technical Conservation Assessment (Holmes et al. 2005a), and the Wyoming Greater Sage-Grouse Conservation Plan (WYGFD 2003) were reviewed to determine habitat needs. Since the Shoshone is not known to contain any leks and is outside of the core areas for sage-grouse, viability risk from forest management is likely low.

Conservation measures summarized include:

- 1) Prevent or reduce the risk for large stand-replacement fires in sagebrush habitat. Conduct prescribed burns that are small and patchy and maintain habitat diversity. Retain areas of large expanses of sagebrush habitat (minimize edge created).
- 2) To reduce the risk of further spread, prescribed burns should not occur in areas with cheatgrass and other invasive plants.
- 3) Maintain native grasses and forbs through proper livestock grazing practices. Use rotational grazing systems to provide rest.
- 4) Consider resting burned areas from grazing to provide adequate regeneration of native vegetation.
- 5) Provide escape ramps at livestock watering facilities.
- 6) Maintain water abundance and associated vegetation at springs and seeps.
- 7) Prioritize and aggressively treat invasive weeds to prevent additional loss of sagebrush habitats.
- 8) Limit the number of new roads. Reclaim old roads that are not being used. Discourage road construction and other developments where it would reduce sagebrush habitat patch size.
- 9) Retain sagebrush habitat (no type conversions).
- 10) Re-establish sagebrush and native bunch grasses in habitat now dominated by non-native weeds.
- 11) Provide a mosaic of open (5 percent) to moderate (25 percent) shrub canopy cover on the landscape.

- 12) Work collaboratively with the WGFD to ensure uniform and consistent application of Sage Grouse Executive Order #2011-5 to maintain and enhance greater sage-grouse habitat and populations.

Monitoring Considerations

Sage-grouse populations are difficult to monitor outside of known lek sites. The Shoshone will continue to rely on WGFD lek observation data. On the Forest, habitat inventory and monitoring would be the best approach for this species. This could include monitoring prescribed fire treatments within sagebrush habitat.

Effects Analysis: Plan revision activities that could potentially influence the greater sage-grouse primarily involve fuels treatment activities, and livestock grazing. Differences in projected outputs by alternative for these activities are displayed in Table BE- 14.

Table BE- 14 Activities and projected outputs that could potentially influence greater sage-grouse, by alternative

	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Vegetation Treatment Acres Prescribed Fire(Total)	23,559	23,302	23,299	23,342	22,823	21,910
Grass	909	914	911	912	935	970
Sagebrush	2,729	2,700	2,716	2,711	2,599	2,423
Livestock Grazing						
Permitted AUMs (Cattle only)	55,492	55,492	30,992	55,492	57,890	61,092
Suitable Acres (Total)	359,620	359,620	201,020	359,620	359,620	399,600

Direct and Indirect Effects

Alternative A: No action

As displayed in Table BE- 14, alternative A provides for a similar amount of fuels treatment in mixed-shrubland as alternatives B-F. These treatments primarily involve prescribed fire to reduce fuels hazards associated with mature, medium-density shrublands, including sagebrush. Because sagebrush is not a target species for fuels reduction on the planning area, potential impacts to occupied Greater sage-grouse habitat from fuels reduction activities on the Shoshone are expected to be minor, but cannot be completely discounted.

Livestock grazing can have negative influences on greater sage-grouse if they overlap occupied habitat. Impacts to riparian areas and understory forage plants are of particular concern because of their importance to breeding hens and new broods. As displayed in Table BE- 14, the permitted amount and area for cattle grazing does not differ among alternatives A, B, and D. These activities are therefore predicted to have potential negative influences on the greater sage-grouse where activities and habitat overlap. On National Forest System land, however, these activities are expected to be minor because of the small amount of acreage involved and the conservation

measures developed to minimize potential impacts. These conservation measures are similar across alternatives.

Action Alternatives: Alternatives B-F

As displayed in Table BE- 14, alternatives B-F provide for a similar amount of fuels treatment in mixed-shrubland, with a slight decrease in alternative E and greater decrease in alternative F. Because sagebrush is not a target species for fuels reduction of National Forest System land, potential influences on greater sage-grouse and other sage-associated species are expected to be similar to alternative A.

As displayed in Table BE- 14, alternatives B and D provide for the same amount of livestock grazing as alternative A. There is a slight reduction in AUMs and area in alternative C, and a slight increase in AUMs in alternative D. The decrease in grazing area and stocking rates in alternative C may provide some secondary benefits to species such as the sage-grouse, while the increase in alternative D may be associated with a higher degree of habitat impacts to the species. Alternatives E and F maintain the highest permitted forage allocation to livestock and are therefore assumed to have a potential for negative impacts to occupied sage-grouse habitat if the activities overlap. Overall, however, potential impacts are expected to be similar and based on site-specific areas where conservation measures are available to alleviate identified problems. The conservation measures are similar across all alternatives.

Cumulative Effects

There is little to no management activity that occurs in sagebrush on the Shoshone, except for grazing. Although sagebrush has a limited distribution across the forest, livestock grazing effects have occurred where grazing activities occur within active allotments. Fuels management may occur in areas, which include small stands of sagebrush but otherwise are dominated by other vegetation types. Management actions are conducted in sagebrush grasslands on the adjacent BLM lands where the objectives include opening up decadent stands to improve the grass/forb understory, to increase the age class diversity, to improve forage conditions, and habitat improvement. Overall, little influence or cumulative effects on sagebrush-associated species is expected on the Shoshone as a whole because of limited activities in this habitat type.

Determination

All Plan revision alternatives, including alternative A, “**may adversely impact individuals (Greater sage-grouse), but would not likely result in a loss of viability on the Planning Area, nor cause a trend to federal listing or a loss of species viability rangewide.**” The rationale for this determination is as follows:

- No core habitat for greater sage grouse occurs on the Shoshone but the Forest likely contains some late-summer brood rearing habitat.
- The primary threats to sage-grouse populations associated with the Shoshone involve habitat conversions and activities on private lands.
- Some Plan revision activities could overlap occupied sage-grouse habitat and have negative influences on the species.
- The Shoshone adheres to the applicable conservation measures in the draft Greater Sage-Grouse Umbrella Candidate Conservation Agreement with Assurances for Wyoming and is taking action to maintain and improve habitat conditions.

Loggerhead shrike (Lanius ludovicianus)

History, Status, and Distribution on the Shoshone

Loggerhead shrikes are considered a G4/S3 species by the State Natural Heritage ranking for Wyoming. Historical populations, distribution or abundance are unknown for this species on the Shoshone. They are also ranked as level II priority species (monitoring) by Wyoming Partners in Flight for shrub-steppe habitat, and are Forest Service R2 sensitive species.

The loggerhead shrike is a widespread species in North America. It occurs across the United States from central Washington, and Virginia in the north, to the southern states and central plains (except for heavily forested higher mountains and higher portions of the desert), and across Canadian prairies (Yosef 1996). It occupies a distinctive position in avian communities by preying on reptiles, mammals, and other birds, as well as invertebrates. Recent contractions in its range and declines in abundance have occurred in many areas of North America and in several different habitat types (Wiggins 2005). It is one of the few passerines whose population has declined continent-wide in recent decades (Yosef 1996). In Wyoming, it is found across the state, breeding in basin-prairie shrublands, sagebrush grasslands, mountain-foothills shrublands, pine-juniper woodlands, and woodland-chaparral (Nicholoff 2003).

They are an uncommon resident Forest-wide and suitable breeding habitat appears to be rare on the Shoshone. There have been incidental observations on the Forest (WYNND 2010). However, none have been observed during recent surveys by the Rocky Mountain Bird Observatory from 2002 to 2009 (Hanni et al. 2009, Rehm-Lorber et al. 2010). There are currently no known population estimates or trends for the species on the Shoshone. At the state level, Breeding Bird Surveys indicate a very slight declining trend (- 0.1), but the trend is not significant ($p = 0.97$) (WGFD 2010). It is thought that population declines are due to habitat loss and conversion to cultivation and urbanization, loss of insect prey due to pesticide use, and pesticide contamination (especially on wintering grounds) (Nicholoff 2003).

Habitat Distribution and Condition on the Shoshone

In Wyoming, loggerhead shrikes are found in shrub-steppe, shrubland, and woodland habitats. They breed in basin-prairie shrublands, sagebrush grasslands, mountain-foothills shrublands, pine-juniper woodlands, and woodland-chaparral (Nicholoff 2003).

Loggerhead shrikes need relatively open habitat with scattered trees and shrubs for nesting and perch sites with low vegetation and bare ground for foraging (Nicholoff 2003). Shrikes also need barbed wire fences or thorny trees for impaling prey. Nesting habitat appears to be the most critical factor in habitat selection (Wiggins 2005). On the Shoshone, there are about 459,000 acres classified as grassland and 38,784 acres of sagebrush (USFS 2012b).

The grassland cover type may be declining relative to sagebrush habitat, which may be due to fire suppression. However, the sagebrush cover type may not be above its historic range of variability (USFS 2012a).

Livestock grazing in shrub-steppe habitats can influence loggerhead shrike habitat. It has been shown in short-grass prairie and shrub-steppe habitats which are incidental on the Shoshone, anything more than light grazing may degrade the habitat by eliminating grass and thereby reducing prey populations (Wiggins 2005). Livestock grazing may pose a significant threat to loggerhead shrike nesting habitat, as cattle often seriously damage thickets and small trees (Wiggins 2005). Also, conversion of shrub-steppe habitats to grasslands to benefit livestock

grazing, decreases breeding habitat and increases fragmentation (Wiggins 2005). However, both rotational grazing systems and the later turn-out date of most livestock operations likely provide adequate areas of little influence from this effect. Fences associated with cattle allotments can provide needed hunting perches and barbed wire can provide needed locations for impaling prey.

Collisions with vehicles have been noted as a significant source of mortality and may be more severe in juvenile shrikes (Wiggins 2005). The loggerhead shrike foraging behavior along roadways, where perches are plentiful, and characteristically flying low, increases the chances of collisions with vehicles (Wiggins 2005). Most studies have focused on mortalities along highways. It is unknown to what extent forest roads may contribute to shrike mortality.

Risk Factors

Primary risk factors from forest management include: degradation and loss of nesting trees/shrubs, degradation of foraging habitat due to overgrazing by cattle, reductions in the prey base due to pesticides, and habitat fragmentation/degradation due to loss of shrub-steppe and sagebrush habitats. Off-Forest risks include the loss of habitat due to agricultural conversion.

Habitat and Population Management Considerations

Retention of large blocks of grassland/sagebrush/shrub-steppe habitat at a watershed scale would provide habitat for populations of this species. It is assumed that the size and quantity of habitat blocks needed would be within a range of what historically occurred, and would be considered reasonable.

Prevent large-scale fires/prescribed burning in sagebrush habitat. Limit small-scale fires to non-breeding season. The guidelines developed for vegetation management in sage grouse habitat (WGFD 2003) would likely be adequate for this species.

Roads can have negative effects on these species. Roads can increase habitat fragmentation, and increase the risk of vehicle collisions. Additional road construction in large stands of sagebrush should be minimized.

Conservation Measures

In order to maintain and improve potential habitat for the loggerhead shrike on the Shoshone, the following conservation measures were developed for incorporation into Forest Plan goals, objectives, standards and guidelines. Inclusion of these measures would continue to provide adequate habitat for this species and other shrub-steppe associated species resulting in a low viability risk to this species.

Conservation measures summarized include:

- 1) Prevent or reduce the risk for large stand-replacement fires in sagebrush habitat. Conduct prescribed burns that are small and patchy and maintain habitat diversity. Retain areas of large expanses of sagebrush and shrub-steppe habitat.
- 2) To reduce the risk of further spread, prescribed burns should not occur in areas with cheatgrass and other non-native weeds.
- 3) Maintain native grasses and forbs through proper grazing limitations. Use rotational grazing systems to provide rest and areas with reduced potential for cowbird parasitism.

Provide for retention of about 50 percent of current year's growth of herbaceous vegetation for habitat in the following season.

- 4) Consider resting burned areas from grazing to provide adequate regeneration of native vegetation.
- 5) Prioritize and aggressively treat invasive weeds to prevent additional loss of sagebrush habitats.
- 6) Limit the number of new roads. Reclaim old roads that are not being used. Discourage road construction and other developments where it would reduce sagebrush habitat patch size.
- 7) Retain grassland and sagebrush habitats (no type conversions).
- 8) Re-establish sagebrush and native bunch grasses in habitat now dominated by non-native weeds.
- 9) Provide a mosaic of open (5 percent) to moderate (25 percent) shrub canopy cover on the landscape.
- 10) Avoid or minimize insecticide use in shrubland habitats to maintain a food source for loggerhead shrikes (and other insectivores). Postpone all insecticide use until loggerhead shrikes and other insectivores have completed their breeding cycle.

Monitoring Considerations

Loggerhead shrikes can be monitored in conjunction with avian point count surveys. About 5 years of data collection would be needed to establish baseline trends. Habitat inventory and monitoring should also be considered in conjunction with population monitoring.

Effects Analysis: In occupied habitat, Plan revision activities that could potentially influence loggerhead shrikes primarily involve fuels treatment. Differences in projected outputs by alternative for these activities are displayed in Table BE- 15.

Table BE- 15 Activities and Projected Outputs that could Potentially Influence Loggerhead Shrike, by Alternative

	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Vegetation Treatment Acres Prescribed Fire(Total)	23,559	23,302	23,299	23,342	22,823	21,910
Grass	909	914	911	912	935	970
Sagebrush	2,729	2,700	2,716	2,711	2,599	2,423
Livestock Grazing						
Permitted AUMs (Cattle only)	55,492	55,492	30,992	55,492	57,890	61,092
Suitable Acres (Total)	359,620	359,620	201,020	359,620	359,620	399,600

*Direct and Indirect Effects***Alternative A: No action**

No direct or indirect effects on the loggerhead shrike are expected from alternative A because the species is not known to nest on the National Forest System portion of the Shoshone. Suitable habitat for the loggerhead shrike is limited, with no breeding or local populations confirmed on lands within the planning area.

Action Alternatives: Alternatives B-F

No direct or indirect effects on the loggerhead shrike are expected from implementation of any of the action alternatives because occurrence of this species is considered incidental to rare. Suitable habitat for this species on National Forest System land is limited, with no breeding or local populations confirmed within the planning area.

Cumulative Effects

No cumulative effects are expected because of lack of suitable nesting habitat.

Determination

All Plan revision alternatives, including alternative A, are expected to have **No Impact on the loggerhead shrike or its primary habitat**. The rationale for this determination follows:

- The loggerhead shrike is considered incidental or extremely rare on the Shoshone, with no breeding populations known to occur.

*Northern harrier (Circus cyaneus)***History, Status, and Distribution on the Shoshone**

Northern harriers are considered a G5/S4B/S5N species by the State Natural Heritage ranking for Wyoming. There are two rankings for harriers in Wyoming for breeding and non-breeding birds (wintering in Wyoming). Historical populations, distribution or abundance are unknown for this species on the Forest.

Northern harriers are a holarctic species. In North America they breed in Alaska, through most of Canada, south to the Texas, Wisconsin, and the New England states (Macwhirter and Bildstein 1996). They winter throughout most of the conterminous United States, Mexico, and Central America. They breed throughout Wyoming in short-grass prairie and shrub-steppe and are considered a common species in the state (Slater and Rock 2005).

During surveys on the Shoshone from 2002 to 2008, the Rocky Mountain Bird Observatory detected three birds; one in 2006, two in 2007, and one in 2008 (Hanni et al. 2009). Trend data is not available for harriers on the Shoshone or in Wyoming. This is due to the low occurrence of harriers on survey routes.

Habitat Distribution and Condition on the Shoshone

In Wyoming, northern harriers are primarily found in short-grass prairie and shrub-steppe habitat. They appear to be area-sensitive, thus preferring large unfragmented patches of habitat (Macwhirter and Bildstein 1996)

About 459,000 acres are classified as grassland and 38,784 acres of sagebrush on the Shoshone (USFS 2012b). Harriers are most likely to occur in the lower-elevation shrub-steppe and grasslands.

The grassland cover type may be declining relative to sagebrush habitat. This may be due to fire suppression. However, the sagebrush cover type may not be above its historic range of variability (USFS 2012a). Also, in some areas prescribed fire may be reducing the advancement of sagebrush and trees into grassland habitat.

Overgrazing in mixed and short-grass prairies is a major threat to harrier habitat. Most grazing causes the vegetation to become too short and open for harriers to utilize. However, both rotational grazing systems and the later turn-out date of most livestock operations likely provide adequate areas of little influence from this effect.

Risk Factors

The primary risk factors from forest management are livestock grazing and fire suppression. Other risk factors include cover type conversion to cropland and urban development. Both of these risk factors impact northern harrier habitat off of the Forest.

Habitat and Population Management Considerations

Retention of large blocks of grassland/sagebrush habitat at a watershed scale would provide for ensured habitat for populations of this species. Although to what level is unknown, it is assumed that within a range of what likely historically occurred is reasonable.

The use of prescribed fire and wildfire are important to reduce the impacts from shrub and tree encroachment into grasslands and to create a mosaic of habitats.

Conservation Measures

In order to maintain and improve potential habitat for northern harriers on the Shoshone, the following conservation measures were developed for incorporation into Forest Plan goals, objectives, standards and guidelines. Inclusion of these measures would continue to provide adequate habitat for this species and other grassland associated species resulting in a low viability risk to this species.

Conservation measures summarized include:

- 1) Allow for wildland fire use, where appropriate, to create a mosaic of habitats and reduce encroachment from shrubs and trees into grasslands.
- 2) Utilize prescribed fire to create a mosaic of habitats and to reduce tree and shrub encroachment.
- 3) To reduce the risk of further spread, prescribed burns should not occur in areas with cheat grass and other non-native weeds.
- 4) Maintain native grasses and forbs through proper grazing limitations. Utilize rotational grazing systems.
- 5) Consider resting burned areas from grazing to provide adequate regeneration of native vegetation.

- 6) Prioritize and aggressively treat invasive weeds to prevent additional loss of grassland habitats.
- 7) Retain grassland and sagebrush habitats (no type conversions).
- 8) Re-establish native bunch grasses in habitat now dominated by non-native weeds.

Monitoring Considerations

Of most importance for this species would be to attain distribution information for the Forest. This could be done utilizing roadside raptor surveys within suitable habitat. Two potential key areas to survey would be the arid grasslands in the South Fork Shoshone River drainage and Sunlight Basin.

Effects Analysis: Plan revision activities that could potentially influence the northern harrier primarily involve livestock grazing, and fire suppression. Differences in projected outputs by alternative for these activities are displayed in Table BE- 16.

Table BE- 16 Activities and projected outputs that could potentially influence northern harrier, by alternative

	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Vegetation Treatment Acres Prescribed Fire(Total)	23,559	23,302	23,299	23,342	22,823	21,910
Grass	909	914	911	912	935	970
Sagebrush	2,729	2,700	2,716	2,711	2,599	2,423
Wildfire Acres	185,152	182,900	184,132	183,703	174,983	161,363
Livestock Grazing						
Permitted AUMs (Cattle only)	55,492	55,492	30,992	55,492	57,890	61,092
Suitable Acres (Total)	359,620	359,620	201,020	359,620	359,620	399,600

Direct and Indirect Effects

Alternative A: No action

Direct/Indirect Effects: As displayed in Table BE- 16, alternative A provides for a similar amount of fuels treatment in mixed-shrubland as alternatives B-F. These treatments primarily involve prescribed fire to reduce fuels hazards associated with mature, medium-density shrublands, including sagebrush. Because sagebrush is not a target species for fuels reduction on the planning area, potential impacts to northern harrier from fuels reduction activities on the Shoshone are expected to be minor, but cannot be completely discounted.

Wildland fire use is not a planned output in any of the alternatives. However, it will be utilized as a tool to allow natural disturbances to occur as opportunities arise. It is estimated that all

alternatives may allow from 161,363 to 185,152 acres of wildland fire use. Because sagebrush is not a target species for wildland fire use on the planning area, potential impacts to northern harrier from this activity on the Shoshone are expected to be minor, but cannot be completely discounted.

Cattle grazing on the Shoshone is likely to overlap potential habitat for the northern harrier. As displayed in Table BE- 16, the permitted amount and area for cattle grazing does not differ among alternatives A, B, and D. These activities are therefore predicted to have potential negative influences on individual breeding pairs of northern harriers where activities and habitat overlap. On National Forest Systems land, however, these activities are expected to be minor because of the small amount of acreage involved and the conservation measures developed to minimize potential impacts. These conservation measures are similar across alternatives.

Action Alternatives: Alternatives B-F

As displayed in Table BE- 16, alternatives B-E provide for a similar amount of fuels treatment in mixed-shrubland, with a slight decrease in alternative E and greater decrease in alternative F. Because sagebrush is not a target species for fuels reduction of National Forest Systems land, potential influences on northern harrier and other sage-associated species are expected to be similar to alternative A.

As displayed in Table BE- 16, alternatives B and D provide for the same amount of livestock grazing as alternative A. There is a slight reduction in AUMs and area in alternative C, and a slight increase in AUMs in alternative D. The decrease in grazing area and stocking rates in alternative C may provide some secondary benefits to species such as the northern harrier, while the increase in alternative D may be associated with a higher degree of habitat impacts to the species. Alternatives E and F maintain the highest permitted forage allocation to livestock and are therefore assumed to have a potential for negative impacts to northern harrier habitat if the activities overlap. Overall, however, potential impacts are expected to be similar and based on site-specific areas where conservation measures are available to alleviate identified problems. The conservation measures are similar across all alternatives.

Cumulative Effects

There is little to no management activity that occurs in sagebrush on the Shoshone, except for grazing. Although sagebrush has a limited distribution across the Forest, livestock grazing effects have occurred where grazing activities occur within active allotments. Fuels management may occur in areas, which include small stands of sagebrush but otherwise are dominated by other vegetation types. Management actions are conducted in sagebrush grasslands on the adjacent BLM lands where the objectives include opening up decadent stands to improve the grass/forb understory, to increase the age class diversity, to improve forage conditions, and to improve habitat. Overall, little influence or cumulative effects on sagebrush-associated species is expected on the Shoshone, as a whole, because of limited activities in this habitat type.

Determination

All Plan revision alternatives, including alternative A, **“may adversely impact individuals (northern harriers), but would not likely result in a loss of viability on the Planning Area, nor cause a trend to federal listing or a loss of species viability rangewide.”** The rationale for this determination follows:

- The primary threats to northern harrier populations associated with the Shoshone involve habitat conversions and activities on private lands.

- Some Plan revision activities could overlap occupied northern harrier habitat and have negative influences on the species.
- The Plan revision has incorporated guidance provided to maintain and improve sagebrush habitat conditions.

Short-eared owl (Asio flammeus)

History, Status, and Distribution on the Shoshone

Short-eared owls are considered a G4/S3 species by the State Natural Heritage ranking for Wyoming. Historical populations, distribution, and abundance are unknown for this species on the Shoshone. They are ranked as level I priority species (conservation action) by Wyoming Partners in Flight for short-grass prairies and meadow habitats, a USFWS Bird of Conservation Concern, and a Forest Service Region 2 sensitive species.

The short-eared owl occurs on all continents except Australia and Antarctica. In North America, the species ranges from northern Alaska to northern Labrador, south to California, Utah, Colorado, Missouri, Illinois, Ohio, and Virginia (NatureServe 2011). In Wyoming, they are considered uncommon, but may breed almost anywhere statewide in low-elevation grasslands and marshy areas. Short-eared owl numbers can vary strongly from year-to-year with local breeding numbers increasing dramatically during periods of high rodent abundance (Wiggins 2004). They primarily eat rodents, but also take other small mammals, birds, and insects (Wiggins 2006). Short-eared owls forage primarily by flying low, typically into wind, and dropping down onto prey, sometimes after a brief hover (Wiggins 2004). The population status of this species is difficult to assess because they are nomadic and prone to annual fluctuations in numbers (Wiggins 2004).

The short-eared owl is an uncommon resident Forest-wide, and suitable breeding habitat appears to be rare on the Shoshone. No short-eared owls have been observed on the Forest, but a few have been observed in lower elevations just outside the Forest boundary (WYNND 2010). Also, none were observed on the Shoshone during recent surveys by the Rocky Mountain Bird Observatory from 2002 to 2009 (Hanni et al. 2009, Rehm-Lorber et al. 2010). Trend data is not available for short-eared owls on the Shoshone or in Wyoming. This is due to the low occurrence of short-eared owls on survey routes.

Habitat Distribution and Condition on the Shoshone

Short-eared owls can be found scattered across Wyoming in open grassland, shrub-steppe, and marsh habitats, with an abundance of rodents (Nicholoff 2003). Short-eared owls require relatively large tracts of these habitat types for nesting and foraging. They appear to be particularly sensitive to habitat loss and fragmentation (Wiggins 2006). As ground nesters, they are susceptible to the increased predation pressure associated with fragmented habitats and near rural developments (Wiggins 2006). This is because habitat fragments contain a greater proportion of edge habitats that are favored by predators (Wiggins 2004).

There are about 459,000 acres classified as grassland, 13,981 acres of willow, and 38,784 acres of sagebrush on the Shoshone (USFS 2012b). Short-eared owls are most likely to occur in the lower elevation shrub-steppe, open riparian areas, and grasslands.

Overgrazing in mixed and short-grass prairies is a major threat to short-eared owl habitat. Most grazing causes the vegetation to become too short and open for owls to utilize for both nesting

and foraging. Also, intensive grazing around wetlands can be detrimental to breeding sites (Nicholoff 2003). However, rotational grazing systems, the later turn-out date, and watershed protection of most livestock operations likely provide adequate areas of little influence from this effect.

Risk Factors

Habitat fragmentation is the primary risk factor to short-eared owls. Any forest management activities, such as livestock grazing or road development, which cause fragmentation, may affect short-eared owls. Other risk factors include fire suppression, cover type conversion to cropland, and urban development. All of these risk factors impact short-eared owl habitat on and off of the Forest.

Habitat and Population Management Considerations

Retention of large blocks of grassland/wet meadow/sagebrush habitat at a watershed scale would provide habitat for populations of this species. It is assumed that the size and quantity of habitat blocks needed would be within a range of what historically occurred, and would be considered reasonable.

Livestock grazing can fragment short-eared owl habitat. Improving existing grassland/wetland quality by adjusting livestock grazing to achieve a balanced mix of short/medium/tall grass heights would help improve habitat if breeding is found on the Shoshone.

The use of prescribed fire and wildfire are important to reduce the impacts from shrub and tree encroachment into grasslands and to create a mosaic of habitats.

Roads can have negative effects on short-eared owls. Roads can increase habitat fragmentation. Additional road construction in large grasslands and large stands of sagebrush should be minimized.

Conservation Measures

In order to maintain and improve potential habitat for the short-eared owl on the Shoshone, the following conservation measures were developed for incorporation into Forest Plan goals, objectives, standards and guidelines. Inclusion of these measures would continue to provide adequate habitat for this species and other short-grass prairie and grassland associated species resulting in a low viability risk to this species.

Conservation measures summarized include:

- 1) Allow for wildland fire use, where appropriate, to create a mosaic of habitats and reduce encroachment from shrubs and trees into grasslands.
- 2) Utilize prescribed fire to create a mosaic of habitats and to reduce tree and shrub encroachment.
- 3) To reduce the risk of further spread, prescribed burns should not occur in areas with cheatgrass and other non-native weeds.
- 4) Maintain wetlands and native grasses and forbs through proper grazing limitations. Utilize rotational grazing systems.

- 5) Rest burned areas from grazing to provide adequate regeneration of native vegetation.
- 6) Prioritize and aggressively treat invasive weeds to prevent additional loss of grassland/wetland habitats.
- 7) Limit the number of new roads. Reclaim old roads that are not being used. Discourage road construction and other developments where it would reduce habitat patch size.
- 8) Retain grassland, wetland, and sagebrush habitats (no type conversions).

Monitoring Considerations

The highest priority for this species would be to obtain distribution information on the Shoshone. This could be done utilizing roadside raptor surveys within suitable habitats.

Effects Analysis: Plan revision activities that could potentially influence the short-eared owl primarily involve livestock grazing and fire suppression. Differences in projected outputs by alternative for these activities are displayed in Table BE- 17.

Table BE- 17 Activities and projected outputs that could potentially influence short-eared owl, by alternative

	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Vegetation Treatment Acres Prescribed Fire(Total)	23,559	23,302	23,299	23,342	22,823	21,910
Grass	909	914	911	912	935	970
Sagebrush	2,729	2,700	2,716	2,711	2,599	2,423
Willow	108	108	108	108	105	101
Wildfire Acres	185,152	182,900	184,132	183,703	174,983	161,363
Livestock Grazing						
Permitted AUMs (Cattle only)	55,492	55,492	30,992	55,492	57,890	61,092
Suitable Acres (Total)	359,620	359,620	201,020	359,620	359,620	399,600

Direct and Indirect Effects

Alternative A: No action

No direct or indirect effects on the short-eared owl are expected from alternative A because the species is not known to nest on the National Forest System portion of Shoshone. Suitable habitat for the short-eared owl is limited, with no breeding or local populations confirmed within the planning area.

Action Alternatives: Alternatives B-F

No direct or indirect effects on the short-eared owl are expected from implementation of any of the action alternatives because occurrence of this species is considered incidental to rare. Suitable habitat for this species on National Forest System land is limited, with no breeding or local populations confirmed within the planning area.

Cumulative Effects

No cumulative effects are expected because of lack of suitable nesting habitat.

Determination

All Plan revision alternatives, including alternative A, are expected to have **No Impact on the short-eared owl or its primary habitat**. The rationale for this determination follows:

- The short-eared owl is considered incidental or extremely rare on Shoshone, with no breeding populations known to occur.

6.5 Riparian (lakes, streams, marshes) mammals

*North American river otter (Lontra canadensis)***History, Status, and Distribution on the Shoshone**

The North American river otter is considered a G5/S3 species by the State Natural Heritage ranking for Wyoming. Historical populations, distribution or abundance are unknown for this species on the Shoshone.

Historically, river otters occupied most major drainages in Canada and the continental United States. Due to unregulated trapping, river otters were once extirpated from much of their range. Through recovery efforts, river otters have re-populated much of their former range. They are still absent in most of the western Great Plains and the southwestern United States (Boyle 2006). In Wyoming, they were extirpated from most of the State, except Yellowstone and Grand Teton National Parks. Currently, there are scattered populations in the western two-thirds of the State, including on the Shoshone.

No trend data is available for the Shoshone. In Wyoming, the population is reported to be increasing (Raesly 2001). Formal surveys have not been done on the Shoshone for this species. Past observations were primarily along the North Fork of the Shoshone River (WYNDD 2010).

Habitat Distribution and Condition on the Shoshone

In the Intermountain West, river otters primarily occupy stream-associated habitats. They prefer valley streams to mountain streams. On the Shoshone, valley streams are limited. The North Fork and South Forks of the Shoshone River likely provide the most suitable habitat.

Both of these watersheds are in good or excellent condition (USFS 2008). Those in good condition reflect, to varying degrees, past and present activities. Most of the concern in these good condition watersheds is related to historic uses such as heavy grazing or roading associated with motorized recreation and timber harvest. These watersheds are generally on an improving trend due to recent and ongoing management actions. Continued recovery will occur naturally or through revised management.

Risk Factors

The primary risk factors from forest management are timber harvest and recreational activities. Other risks include water development, water pollution, and urbanization. None of these other risks have a major role on river otter populations on the Shoshone, but they have a larger role downstream from the Shoshone.

Natural risk factors would include flooding and drought, both of which could degrade habitat and reduce prey availability. Drought could affect river otters for a long period of time and over a large area.

Habitat and Population Management Considerations

Timber harvest can reduce riparian cover, increase stream siltation, and reduce woody debris. River otters in Region 2 may be especially vulnerable because of their linear habitat. Timber harvest should be carefully managed in these areas to maintain adequate habitat components.

Recreational activities present river otters with additional risks such as increased risk for mortality from roadkill, disturbance from domestic dogs, and incidental trapping (Boyle 2006).

Conservation Measures

In order to maintain and improve the river otter population and potential habitat on the Shoshone, the following conservation measures were developed for incorporation into Forest Plan goals, objectives, standards and guidelines. Since this species is of low viability concern based on current habitat condition, it is recognized that inclusion of these measures would continue to provide adequate habitat for this species.

Conservation measures summarized include:

- 1) Manage dispersed camping and recreational uses so that degradation of riparian areas does not occur, and achieve improvements in existing degraded areas.
- 2) Maintain forested cover along edges of riparian areas where it naturally exists.
- 3) Locate roads and trails outside of riparian areas to prevent loss of habitat.
- 4) Re-vegetate decommissioned roads within riparian areas.
- 5) Use standard water quality conservation practices when conducting activities within riparian areas, including timber harvest or road and trail construction/reconstruction.

Monitoring Considerations

The most beneficial monitoring for river otters would be to improve information on known observations and distribution on the Shoshone. Surveys could be completed along stream reaches that provide potential habitat.

Effects Analysis: Plan revision activities that could potentially influence the river otter primarily involve water management activities (i.e., water diversions, deletions), and recreational activities. Differences in identified projected outputs by alternative for these activities are displayed in Table BE- 18.

Table BE- 18 Activities and projected outputs that could potentially influence river otter by alternative

	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Miles of open motorized roads and trails- Summer(total)	906	929	788	914	936	966
Special areas and designations	Five wilderness areas One wilderness study area	No new wilderness recommendation	Recommends 628,800 acres of wilderness additions	Recommends 194,500 acres of wilderness additions	No new wilderness recommendation	No new wilderness recommendation
	One wild/scenic river	Proposes three new special interest areas	Proposes three new special interest areas	Proposes three new special interest areas	Proposes one new special interest area (Kirwin)	Proposes no new special interest areas
	One special management unit One research natural area	Proposes six new research natural areas – Beartooth Butte, Lake Creek, Grizzly Creek, Sheep Mesa, Arrow Mountain, Roaring Fork	Proposes eight new research natural areas - Beartooth Butte, Lake Creek, Pat O'Hara, Bald Ridge, Grizzly Creek, Sheep Mesa, Arrow Mountain, Roaring Fork	Proposes eight new research natural areas - Beartooth Butte, Lake Creek, Pat O'Hara, Bald Ridge, Grizzly Creek, Sheep Mesa, Arrow Mountain, Roaring Fork	Proposes 3 new research natural areas - Sheep Mesa, Lake Creek, and Arrow Mountain	Proposes no new research natural areas
	One special interest area	Protects thirteen eligible wild/scenic river segments	Protects thirteen eligible wild/scenic river segments	Protects thirteen eligible wild/scenic river segments	Protects thirteen eligible wild/scenic river segments	Protects thirteen eligible wild/scenic river segments

*Direct and Indirect Effects***Alternative A: No action**

As displayed in Table BE- 18, although differences between alternatives are difficult to evaluate in regard to potential influences on river otters, it is possible that alternative A provides as much potential habitat protection for the species as alternatives B, E, and F, because it provides less indirect influences from motorized recreation that could potentially influence water quality. Alternative A does not identify any additional waterbodies for protection under special areas designations such as Wild and Scenic River corridors that may better control some human-associated impacts. Overall, however, otters continue to expand and the effect from all

alternatives is expected to be secondary to other factors such as drought and private water management activities.

Action Alternatives: Alternatives B-F

All action alternatives (B-F) are expected to allow the continued expansion of river otters into potential habitat on Shoshone. However, alternatives B, C, and D allow for additional protective measures above baseline conditions that may indirectly benefit the river otter. Examples of these include better control of potential erosion from motorized vehicle use and more potential protection of riverine habitat from special area designations. Although continued expansion of river otters is also expected under alternatives E and F, these alternatives may require more site-specific mitigation measures because it allows more active management.

Cumulative Effects

Habitat conditions in most of the smaller perennial streams on the Shoshone have continued to improve over time, but still do not support populations of closely associated species such as beaver. Restoration and expansion of beaver should be emphasized as it most likely results in an increasing trend in potential river otter habitat due to the close association between these species.

Determination

All Plan revision alternatives, including alternative A, “**may adversely impact individuals (river otters), but would not likely result in a loss of viability on the Planning Area, nor cause a trend to federal listing or a loss of species viability rangewide.**” The rationale for this determination follows:

- The North Fork and South Fork of the Shoshone River provide the best suitable habitat, as they are in good or excellent condition
- The primary activities influencing river otters revolve around water management and natural factors such as drought.
- Water management activities are managed to reduce impacts on aquatic species; however, reduced water flows have direct and indirect influences on prey species and habitat conditions.

Water vole (Microtus richardsoni)

History, Status, and Distribution on the Shoshone

Water voles have a heritage ranking of G5/S2 and are a Region 2 sensitive species. Sensitive status is largely based on perceived impacts from livestock grazing and other impacts focused in riparian areas. Historical populations, distribution, or abundance are unknown for this species on the Shoshone.

Water voles only occur in the northwestern United States, and southern British Columbia and Alberta. Within Region 2, water voles are only known to occur on the Shoshone and Bighorn National Forests. On the Shoshone, they are known to occur in several of the major watersheds including: the Clarks Fork River, North Fork Shoshone River, South Fork Shoshone River, Greybull River, Upper Wind River, Popo Agie River, and the Sweetwater River watershed. Presence in the remaining watersheds on the Shoshone is suspected, but not proven via capture or observation (Klaus and Beauvais 2004).

The Shoshone apparently supports a large number of water voles. This suggests a relatively high probability that they will persist here for a long time. Long-term viability of water voles on the Shoshone is further increased by the potential immigration of individuals from populations to the north in Montana, to the west in Yellowstone National Park, and to the south in the Bridger-Teton National Forest (Klaus and Beauvais 2004). Therefore, water voles populations on the Shoshone appear to be secure.

No trend data is available for water voles on the Shoshone. One location in the Beartooth Mountains on the Shoshone has maintained stable female fecundity estimates and stable, possibly even increasing, abundance estimates for 30 years (Klaus and Beauvais 2004).

Habitat Distribution and Condition on the Shoshone

Water voles are closely associated with alpine and subalpine streams. They have been captured along stream courses from about 8,200 feet to 10,520 feet in elevation. They are typically found in linear colonies along spring-fed or glacial streams with gravel bottoms with about a 5-degree slope (Klaus 2003).

Habitat for water voles could be considered abundant on the Shoshone. Based on currently known distribution and distribution modeling (Keinath et al. 2010), water voles have a medium/high probability of occurring in high-elevation riparian meadows on the Shoshone.

All of the watersheds mentioned earlier are in good or excellent condition, with the exception of a subwatershed in Crandall Creek (USFS 2008). Lodgepole Creek was highly impacted by the 1988 Clover Mist Fire and a damaging thunderstorm and flash flood event in 1989. This resulted in significant changes in upland and stream channel stability. Recovery of this subwatershed will take time. This subwatershed is likely at too low of elevation to support water voles.

Riparian habitat is mostly stable and existing protection measures should prevent the loss of any of this habitat type. The conditions of some riparian systems on the Shoshone are outside of their historic ranges of variability due to past impacts from tie hacking, grazing, and water diversions (USFS 2009).

The Shoshone has been improving its management of riparian and wetland areas for the past planning period through improved livestock management efforts in coordination with grazing permittees. Historic levels of livestock grazing were very high in the early 1900s, and have been steadily reduced to bring stocking rates more in line with carrying capacity. Many of the sheep allotments on the Shoshone have been closed or converted to cattle.

Water voles have persisted on the Shoshone despite high historic levels of grazing that likely reduced vegetative cover along riparian areas, compacted soils, incised streams, and eroded stream banks. These effects varied by stream reach. Reductions in both cattle and particularly sheep grazing from historical levels have likely improved riparian areas.

Risk Factors

The primary risk factor from forest management is livestock grazing in alpine and subalpine riparian areas.

Habitat and Population Management Considerations

Maintaining potential habitat for this species includes maintaining adequate amounts of woody vegetation (willow, aspen, etc.) along stream courses and maintaining well-developed

overhanging streambanks with non-compacted soils where burrows can be constructed. High-elevation riparian management can be accomplished through proper livestock grazing management. Currently, a vast majority of wilderness on the Shoshone is not within active allotments.

Overgrazing of the streamside vegetation is the biggest concern. Prolonged and intense livestock grazing, even in the absence of grazing by native species, can eliminate water vole habitat by destroying stream banks, widening stream channels, lowering local water tables, eroding soil, and altering nutrient cycling (Klaus and Beauvais 2004).

Conservation Measures

In order to maintain and improve the water vole population and potential habitat on the Shoshone, the following conservation measures were developed for incorporation into Forest Plan goals, objectives, standards and guidelines. Since this species appears to be wide-spread and most of its habitat is in wilderness, inclusion of these measures would continue to provide adequate habitat for this species.

Conservation measures summarized include:

- 1) Manage livestock grazing so that potential habitat is improved or maintained, particularly during drought years. Retention of vegetative cover at the stream edge would be the primary emphasis factor, as well as maintaining the ecological processes that provide for the long-term maintenance of these habitats.
- 2) Manage dispersed camping and recreational uses such that degradation of riparian areas does not occur, and achieve improvements in existing degraded areas.
- 3) Locate roads and trails outside of riparian areas to prevent loss of habitat.

Monitoring Considerations

The most beneficial monitoring item for water voles would be to monitor populations in known occupied habitat. Also, selected representative populations in grazed and un-grazed (by livestock) occupied habitat could be surveyed at 5-year intervals to determine continued persistence of voles for this next planning period.

Monitoring to determine compliance with and effectiveness of livestock management practices on riparian vegetation and physical stream characteristics would also be beneficial at the Forest-wide scale. Evaluations of the maintenance or improvement of habitat in representative sites Forest-wide would accomplish this need.

Effects Analysis: Plan revision activities that could potentially influence water vole primarily involve livestock grazing. Differences in projected outputs by alternative for these activities are displayed in Table BE- 19.

Table BE- 19 Activities and Projected Outputs that could Potentially Influence Water Vole, by Alternative

	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Livestock Grazing						
Permitted AUMs (Total)	55,881	55,881	31,401	55,881	58,329	61,497
Suitable Acres (Total)	375,368	375,368	216,847	375,400	375,400	415,400
Motorized Recreation- Summer (Acres available)	570,555	570,826	322,381	350,573	656,460	823,907

*Direct and Indirect Effects***Alternative A: No action**

Livestock grazing can have negative influences on water voles when they overlap suitable habitat. Impacts to riparian areas and overstory and understory forage plants are of particular concern because of their importance to water voles in meeting species requirements for cover and food. As displayed in Table BE- 19, the permitted amount and area for cattle grazing does not differ among alternatives A, B, and D. These activities are therefore predicted to have potential negative influences on the water voles where activities and habitat overlap. Cattle could continue to impact certain riparian habitats that this species needs.

As displayed in Table BE- 19, although differences between alternatives are difficult to evaluate in regards to potential influences on water voles, it is possible that alternative A provides as much potential habitat protection for the species as alternatives B, E, and F because it provides less indirect influences from motorized recreation that could potentially influence riparian stream banks and vegetation.

Action Alternatives: Alternatives B-F

In alternatives B-F, there will likely continue to be some problem areas, although there will be more tools (adaptive management strategies) available to fix these problems areas and prevent new ones from starting. Alternatives B and D maintain the same amount of suitable acres and AUMs; as the current Forest Plan (alternative A). Alternative C reduces the total AUMs and would have the least impact on habitat conditions for the water vole. Alternative F increases AUMs substantially compared to all of the other alternatives and would have the potential for the greatest impact to riparian habitat. All alternatives are expected to allow the continued expansion of water voles into potential habitat on Shoshone however more focused management compliance would be needed under alternative F.

As displayed in Table BE- 19, and consistent with its theme, alternative C offers fewer potential riparian habitat disturbances than the other alternatives from summer motorized recreation because of decreases in the amount of motorized use area. Consistent with their themes, alternative D offers the next fewest motorized while alternative F offers the highest amount of acreage. Alternatives B and E offer a balance between the other action alternatives. Reductions in open motorized areas should decrease the potential for loss of habitat due to off-road use.

Cumulative Effects

Cumulative effects over and above the direct and indirect effects mentioned above are minimal on the Shoshone due to the limited amount of private land within the Forest boundary. There are no known proposals for additional development of any of these lands. Lands adjacent to the Forest are primarily private and/or BLM. Private lands receive minimal pressure from urban development trends. These adjacent lands would likely continue to receive impacts from livestock grazing and water depletions that are ongoing. These activities should not impact habitat on the Forest, but may increase the value of riparian habitat on the Shoshone. Individual species protections would be ensured through preparation of site specific NEPA analysis and biological evaluations, with protection offered through Forest-wide standards and guidelines.

Determination

All Plan revision alternatives, including alternative A, “**may adversely impact individuals (water voles), but would not likely result in a loss of viability on the Planning Area, nor cause a trend to federal listing or a loss of species viability rangewide.**” The rationale for this determination is as follows:

- Due to the uncertainty of some recreational uses and expanded road network and potential ground disturbances in riparian habitat.
- These activities would only occur on up to 34 percent of the forested acres and still leave larger areas in “intact” habitat conditions.

6.6 Riparian (lakes, streams, marches) birds

Bald eagle (Haliaeetus leucocephalus)

History, Status, and Distribution on the Shoshone

The bald eagle has a natural heritage ranking of G4/S3B/S5N. They have separate rankings in Wyoming for breeding birds and non-breeding birds (wintering in Wyoming). Bald eagles were delisted from the Endangered Species Act in 2007. Historical populations, distribution, or abundance are unknown on the Shoshone.

Bald eagles are found throughout the United States and Canada where suitable habitat exists. They winter in coastal areas, along major inland river systems and in the intermountain west which includes Wyoming (Buehler 2000). Bald eagles are known to occur on the Shoshone, primarily as foraging birds.

Bald eagles nesting in northwestern Wyoming are part of a significant nesting population in the Rocky Mountains (WGFD 2010). This population extends into Idaho and Montana. Bald eagles don’t regularly nest on the Shoshone since nesting habitat is very limited. All active nests in recent years have been on adjacent BLM land (USFS 2011). Eagles are known to forage along the North and South Forks of the Shoshone River.

No trend data is available that is specific to the Shoshone. Statewide population objective levels have been exceeded since 1987, and the state population continues to increase (WGFD 2010). Within the Greater Yellowstone Ecosystem, carrying capacity for eagles may have been reached in Grand Teton National Park and along the Snake River in Wyoming.

Habitat Distribution and Condition on the Shoshone

Bald eagles typically nest in tall trees near large bodies of water. The majority of wintering bald eagles are found near open water where they feed on fish and waterfowl. When suitable conditions exist, particularly a lack of human disturbance, wintering bald eagles will forage in terrestrial habitats where they prey on small to medium sized mammals (e.g., prairie dogs, jackrabbits); they also scavenge roadkills, winter mortalities of big game, and livestock (Travesky and Beauvais 2004).

Potential nesting habitat primarily occurs along the North and South Forks of the Shoshone River and possibly near other larger rivers and lakes on the Forest. Winter habitat would include these same areas, as well as, big game winter ranges and major roadways (scavenging road kill).

Risk Factors

The primary risk factors from forest management are recreational disturbance to nesting and winter roosting bald eagles. Other risk factors include contaminants, residential development, and collisions with powerlines.

Habitat and Population Management Considerations

Retaining large trees along major rivers and lakes would be the most important forest management emphasis for bald eagle habitat.

Reducing human disturbance around nest and winter roost sites is also important.

Conservation Measures

In order to provide management for this species to maintain or improve its potential distribution on the Shoshone, the following conservation measures were developed for incorporation into Forest Plan goals, objectives, standards and guidelines. Given the lack of potential nesting habitat on the Forest, overall viability risk from forest management to bald eagles is low.

Conservation measures summarized include:

- 1) Known nest and winter roost sites will be protected per the National Bald Eagle Management Guidelines (USFWS 2007).

Monitoring Considerations

Continue to cooperate with the WGFD to monitor bald eagle nests.

Effects Analysis: The Shoshone primarily provides habitat for bald eagles during the non-breeding (winter) period. These eagles have migrated from their northern breeding grounds in search of food supplies such as fish, waterfowl, or carrion. Although numbers may vary, depending upon winter severity and local food supplies, wintering eagles on the Shoshone primarily occur along major river corridors such as the North and South Forks of the Shoshone River, Greybull, and Wind River. The primary activities that could potentially influence primary habitat or prey species for the bald eagle include motorized and non-motorized recreation. Differences in projected output for these activities by alternative are displayed below in Table BE- 20.

Table BE- 20 Activities and projected outputs that could potentially influence bald eagles, by alternative

	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Miles of open motorized roads and trails (Winter total)	670	686	229	675	691	966
Miles of snowmobile trails	276	276	163	276	276	367
Motorized Recreation-Winter(Acres available)	887,590	479,848	103,010	323,687	525,175	825,219

*Direct and Indirect Effects***Alternative A: No action**

Disturbance from motorized and non-motorized recreation can be an impact on bald eagles in winter concentration areas. As displayed in Table BE- 20, alternative A could offer more high-use recreation areas than any of the action alternatives; however this could be due to how the acres were calculated during the 1986 Forest Plan. Most likely alternative F will have similar potential effects to bald eagles depending upon the type, timing, and scope of the activity. Greater winter travel via snowmobiles could theoretically disturb eagles in winter concentration areas and/or while they are roosting or foraging.

Wildlife habitat management to improve big game winter range is projected to occur on 4,000 acres in all alternatives during the life of the Plan revision. This projection includes bighorn sheep and other big game species that may be an important winter food source for bald eagles in some localized areas. Benefits can be expected on a site-specific basis.

All alternatives offer the same amount of riparian habitat improvement over the life of the Plan. These activities may benefit prey species for the bald eagle if they occur in areas where fish or waterfowl species will benefit from the actions.

Action Alternatives: Alternatives B-F

As displayed in Table BE- 20, the action alternatives differ in the amount of undisturbed habitat potentially available for the bald eagle. Of the action alternatives, alternative F offers the largest amount of acres available to winter motorized recreation. In concert with their themes, alternatives C and D offer the least amount of acres available for motorized travel. Alternative C and D, therefore offer the highest probability of maintaining habitat options for bald eagles that depend on little human disturbance. Alternative B and E offers a balance between the three other action alternatives, but also provides more undisturbed habitat and less potential disturbances than the no action. Reductions in open motorized areas during winter should decrease the potential for displacement or disturbances to bald eagles during wintering periods.

As in alternative A, wildlife habitat management to improve big game winter range is projected to occur on 4,000 acres in all of the action alternatives during the life of the Plan revision. This

projection includes bighorn sheep and other big game species that may be important food sources for bald eagles, particularly during the winter period. Benefits can be expected on a site-specific basis.

Cumulative Effects

Most of the winter eagle population is aggregated along specific river corridors that have been identified as bald eagle winter concentration areas. Use of other water bodies by wintering bald eagles is also prohibited by the small amount of area that remains unfrozen or provides predictable food supplies during the winter periods.

Although minor disturbances to individual bald eagles on the Shoshone may occur, no cumulative effects have been identified and the population may be stabilizing to the available habitat and food supply.

Determination

All Plan revision alternatives, including alternative A, “may adversely impact individuals (bald eagles), but would not likely result in a loss of viability on the Planning Area, nor cause a trend to federal listing or a loss of species viability rangewide.” The rationale for this determination is as follows:

- Both winter and summer populations of bald eagles occur on or adjacent to the Shoshone National Forest. However, winter is the primary time of use in concentration areas around river drainages.
- All alternatives involve activities that may influence bald eagle or their primary prey species.
- Impacts are expected to be minimal and localized to individuals.

Harlequin duck (Histrionicus histrionicus)

History, Status, and Distribution on the Shoshone

While considered a G4 species globally (relatively common), Harlequins are considered an S1 species by the State Natural Heritage ranking for Wyoming. This is primarily due to its restricted range. Historical populations, distribution or abundance are unknown for this species on the Shoshone.

Harlequin ducks are known primarily from the northwest and northeast portions of North America and southern Greenland. In its western range, populations may have declined, though breeding populations in the Rocky Mountain Region appeared stable during the 1990s (Robertson and Goudie 1999). Their distribution in Wyoming is restricted to the northwestern portion of the state. Harlequins are known to occur on the Shoshone and in the Greater Yellowstone Ecosystem, as recorded in recent surveys conducted by the WGFD (WGFD 2003, 2008, 2009).

Based on surveys in 2002, the WGFD (2009) estimated that there are 70 breeding pairs in Wyoming. In 2007, these areas were resurveyed and the number of pairs observed was substantially lower (-67 percent) (WGFD 2009). On the Shoshone, the WGFD (2009) also found fewer pairs than during surveys in 2002. It should be noted that 2007 was a low water year, so breeding pairs may have departed early in response to those conditions.

Habitat Distribution and Condition on the Shoshone

Harlequin ducks use fast moving stream systems for breeding habitat and winter along rocky coastlines. They typically nest on mid-stream islands (Wiggins 2005).

Based on past observations, Harlequins are known to occur along several rivers on the Shoshone including; North Fork Shoshone River, South Fork Shoshone River, Torrey Creek, Jakey's Fork, Crandall Creek, Hoodoo Creek, Clarks Fork, Lake Creek, Sunlight Creek, and Greybull River.

All of these watersheds are in good or excellent condition, with the exception of a subwatershed in Crandall Creek (USFS 2008). Lodgepole Creek was highly impacted by the 1988 Clover Mist Fire and a damaging thunderstorm and flash flood event in 1989. This resulted in significant changes in upland and stream channel stability. Recovery of this subwatershed will take time.

Risk Factors

The primary risk factors from forest management are recreational activities (such as rafting and hiking) disturbing nesting birds and livestock grazing.

Habitat and Population Management Considerations

Within Region 2, their primary threats are disturbance to females at nest sites and degradation of water quality (Wiggins 2005). Harlequin females have abandoned nest sites after repeated human disturbance (Wiggins 2005).

Timber harvest and associated activities such as road building could create potential impacts to Harlequin duck habitat. This is primarily due to increased run-off and altered water flow (Wiggins 2005).

Livestock grazing may have an impact to Harlequin duck habitat. Impacts could include: reduction in streamside vegetation, increased run-off, and direct disturbance to nesting birds (Wiggins 2005).

Maintaining potential habitat for this species is necessary through proper riparian and aquatic habitat management that maintains adequate amounts of vegetative cover, with both herbaceous and woody types being important, along stream courses and in wetland areas. Any activities, including livestock grazing and timber harvest, should be carefully managed in these areas to maintain adequate cover components. Loss of vegetative cover directly relates to higher levels of predation and water quality issues.

Minimizing human disturbance during the nesting season along streams that contain potential habitat also is important.

Conservation Measures

In order to maintain and improve the Harlequin duck population and potential habitat on the Shoshone, the following conservation measures were developed for incorporation into Forest Plan goals, objectives, standards and guidelines. Since this species is of viability concern, it is recognized that inclusion of these measures would continue to provide adequate habitat for this species.

Conservation measures summarized include:

- 1) Manage livestock grazing so that potential habitat is improved or maintained, particularly during drought years. Retention of vegetative cover at the stream edge would be the primary emphasis factor, as well as maintaining the ecological processes that provide for the long term maintenance of these habitats.
- 2) Manage dispersed camping and recreational uses so that degradation of riparian areas does not occur, and achieve improvements in existing degraded areas. Where known nesting of this species occurs, consider regulating recreational use during the nesting season to avoid disturbance.
- 3) Maintain forested cover along edges of riparian areas where it naturally exists.
- 4) Locate roads and trails outside of riparian areas to prevent loss of habitat and to reduce potential disturbance during nesting.
- 5) Re-vegetate decommissioned roads within riparian areas.
- 6) Use standard water quality conservation practices when conducting activities within riparian areas, including timber harvest or road and trail construction/reconstruction.

Monitoring Considerations

The most beneficial monitoring for Harlequin ducks will be to improve information on known observations and any potential breeding areas. The Shoshone should continue to coordinate with the WGFD to complete Harlequin duck surveys. If breeding sites are found, an evaluation of the habitat being used may help provide further information for future monitoring, including human uses that may be disturbing any potential nest sites.

Effects Analysis: Management activities that may have effects to Harlequin ducks include loss or degradation of habitat that eliminate or reduces cover and food supply and disturbance at the nest site or of nesting. Differences in projected outputs by alternative for these activities are displayed in Table BE- 21.

Table BE- 21 Activities and projected outputs that could potentially influence Harlequin duck, by alternative

	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Livestock Grazing						
Suitable Acres (Total)	375,368	375,368	216,847	375,368	375,368	415,370
Permitted AUMs (Total)	55,881	55,881	31,401	55,881	58,329	61,497
Dispersed Recreation Management	Prohibits camping within 100 feet of lakes/streams	Prohibits camping within 100 feet of streams and 200 feet of lakes	Same as Alt. B	Same as Alt. B	Same as Alt. B	Same as Alt. B

Table BE- 21 Activities and projected outputs that could potentially influence Harlequin duck, by alternative

	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Road Construction Miles-Timber	2	2	2	2	3	4
Special areas and designations	Five wilderness areas One wilderness study area	No new wilderness recommendation	Recommends 628,800 acres of wilderness additions	Recommends 194,500 acres of wilderness additions	No new wilderness recommendation	No new wilderness recommendation
	One wild/scenic river	Proposes three new special interest areas	Proposes three new special interest areas	Proposes three new special interest areas	Proposes one new special interest area (Kirwin)	Proposes no new special interest areas
	One special management unit One research natural area	Proposes six new research natural areas – Beartooth Butte, Lake Creek, Grizzly Creek, Sheep Mesa, Arrow Mountain, Roaring Fork	Proposes eight new research natural areas - Beartooth Butte, Lake Creek, Pat O'Hara, Bald Ridge, Grizzly Creek, Sheep Mesa, Arrow Mountain, Roaring Fork	Proposes eight new research natural areas - Beartooth Butte, Lake Creek, Pat O'Hara, Bald Ridge, Grizzly Creek, Sheep Mesa, Arrow Mountain, Roaring Fork	Proposes 3 new research natural areas - Sheep Mesa, Lake Creek, and Arrow Mountain	Proposes no new research natural areas
	One special interest area	Protects thirteen eligible wild/scenic river segments	Protects thirteen eligible wild/scenic river segments	Protects thirteen eligible wild/scenic river segments	Protects thirteen eligible wild/scenic river segments	Protects thirteen eligible wild/scenic river segments

*Direct and Indirect Effects***Alternative A: No action**

As displayed in Table BE- 21, although differences between alternatives are difficult to evaluate in regard to potential influences on Harlequin ducks, it is possible that alternative A provides as much potential habitat protection for the species as the alternative F because it provides less indirect influences from livestock grazing that could potentially influence stream bank habitat and water quality. Alternatives B-E all provide more potential habitat protection than alternative A due to no increase or less amount of livestock grazing.

Construction of new roads as result of timber harvest that would remain open to public use is very minimal for all alternatives; estimated between 2 to 4 miles. Effects may be associated with these activities, but are expected to be minor because of best management practices in riparian habitat and the large amount of unroaded area that remains undeveloped.

Alternative A does not identify any additional waterbodies for protection under special area designations such as Wild and Scenic River corridors that may better control some human-associated impacts. Overall, however, Harlequin ducks continue to expand, and the effect from all alternatives is expected to be secondary to other factors such as drought and private water management activities.

Action Alternatives: Alternatives B-F

All action alternatives (B-F) are expected to allow the continued expansion of Harlequin duck into potential habitat on Shoshone. However, alternatives B, C, and D allow for additional protective measures above baseline conditions that may indirectly benefit the duck. Examples of these include better control of potential erosion from road construction due to vegetation management and more potential protection of riverine habitat from special area designations. Although continued expansion of Harlequin ducks is also expected under alternatives E and F, these alternatives may require more site-specific mitigation measures because they allow more active management.

Cumulative Effects

Cumulative effects over and above the direct and indirect effects mentioned above are minimal on the Shoshone due to the limited amount of private land within the Shoshone boundary. There are no known proposals for additional development of any of these lands. Lands adjacent to the Forest are primarily private and/or BLM. Private lands receive minimal pressure from urban development trends. These adjacent lands would likely continue to receive impacts from livestock grazing and water depletions that are ongoing. These activities should not impact habitat on the Shoshone, but may increase the value of riparian habitat on the Forest. Individual species protection would be ensured through preparation of site-specific NEPA analysis and biological evaluations, with protection offered through Forest-wide standards and guidelines.

Determination

All Plan revision alternatives, including alternative A, “**may adversely impact individuals (Harlequin ducks), but would not likely result in a loss of viability on the Planning Area, nor cause a trend to federal listing or a loss of species viability rangewide.**” The rationale for this determination follows:

- There is uncertainty of some recreational uses and expanded road network and potential ground disturbances in riparian habitat.
- Streams used by Harlequin ducks are in good or excellent condition
- Water management activities are managed to reduce impacts on aquatic species; however, reduced water flows have direct and indirect influences on prey species and habitat conditions.

Trumpeter swan (Cygnus buccinators)

History, Status, and Distribution on the Shoshone

Trumpeter swans are considered a G4/S2 species by the State Natural Heritage ranking for Wyoming. This is primarily due to its restricted range. Historical populations, distribution or abundance are unknown for this species on the Shoshone.

Historically, trumpeter swans ranged across the northern United States, Canada, and Alaska. Their current distribution is sporadic, with populations in northwest Canada and Alaska, the northern Rocky Mountains, and the Upper Midwest. The Tri-State Flock, which includes the Shoshone, is within the Rocky Mountain Population. The Shoshone is outside of the “Core” Tri-State Area which includes Wyoming, Idaho, and Montana directly outside of Yellowstone National Park (USFWS 2010).

Trumpeter swans are surveyed annually within and outside of the Tri-State Core Area (WGFD 2010). On the Shoshone, trumpeter swans are occasionally observed; however, no breeding pairs have been observed (WGFD 2010). They have primarily been seen in the Swamp Lake area.

Trend data is not available for the trumpeter swan population on the Shoshone, but trend data is available for the Tri-State Flock, which includes northwestern Wyoming. Counts of swans in the fall in northwestern Wyoming have increased steadily since about 1995 (Figure BE- 9).

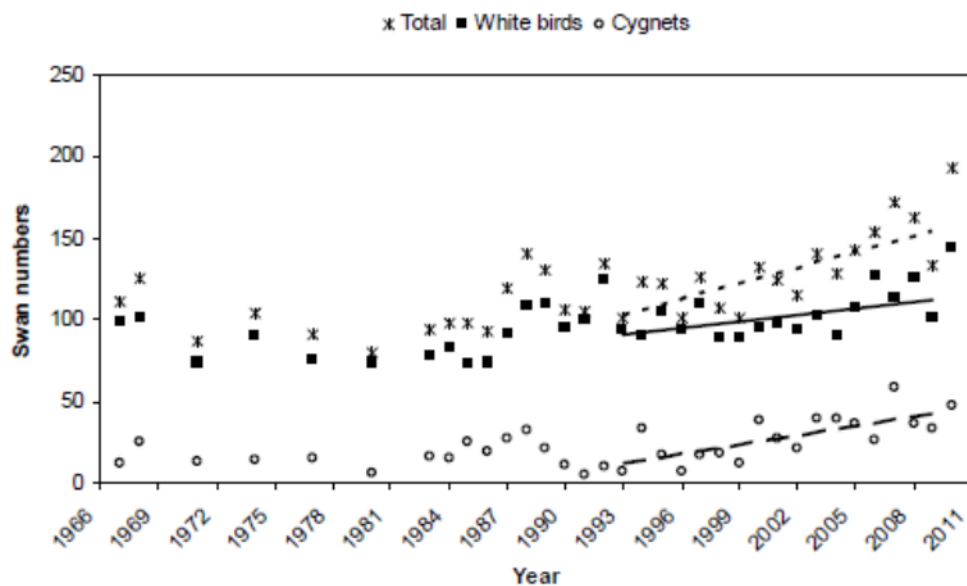


Figure BE- 9 Counts of swans in Wyoming during the Fall Trumpeter Swan Survey, 1967–2010 (dotted, solid, and dashed lines depict trends for total swans, white birds, and cygnets, respectively) (USFWS 2010).

Habitat Distribution and Condition on the Shoshone

Trumpeter swans breed primarily in shallow marshes, ponds, and lakes (Slater 2006). Nests are usually in or surrounded by water. They often nest on beaver or muskrat houses.

Based on past observations, trumpeter swans are occasionally observed on the Shoshone with most observations around Swamp Lake. Swamp Lake and the adjacent wetlands probably provide the highest potential habitat on the Shoshone. Swamp Lake and the adjacent wetlands are currently managed as the Swamp Lake Botanical Area, and will continue to be managed as such in the Forest Plan revision.

Risk Factors

The primary risk factor from forest management is recreational activities disturbing nesting birds. Another primary risk factor is over-crowding of wintering birds; however, trumpeter swans are not known to winter on the Shoshone.

Habitat and Population Management Considerations

Motorized and non-motorized recreation can reduce habitat availability and quality for trumpeter swans in breeding and non-breeding areas (Slater 2006). Therefore, minimizing human disturbance during the nesting season is important.

Breeding habitat is very limited on the Shoshone, as shallow wetlands are not a common feature on the landscape. The highest potential habitat on the Shoshone is at Swamp Lake and is protected as the Swamp Lake Botanical Area.

Currently, there are no known breeding pairs on the Shoshone. Past use by trumpeters has primarily been individual birds and fall migrants. Since no known breeding pairs currently exist on the Shoshone, the risk to viability of the species on the Forest is low.

Conservation Measures

In order to maintain and improve potential habitat for trumpeter swans on the Shoshone, the following conservation measures were developed for incorporation into Forest Plan goals, objectives, standards and guidelines. Since this species is not of viability concern, these measures would continue to maintain and improve potential habitat for this species.

Conservation measures summarized include:

- 1) Coordinate with the WGFD to identify potential breeding wetlands and evaluate if there is potential to improve breeding habitat.
- 2) Maintain wetlands.
- 3) Locate roads and trails outside of riparian areas to prevent loss of habitat and to reduce potential disturbance during nesting.
- 4) Use standard water quality conservation practices when conducting activities within riparian areas, including timber harvest or road and trail construction/reconstruction.
- 5) Avoid disturbing trumpeter swan pairs during the breeding season.

Monitoring Considerations

The most beneficial monitoring for trumpeter swans will be to improve information on known observations and any potential breeding areas. The Shoshone should coordinate with the WGFD for completion of annual swan surveys. If breeding sites are found, an evaluation of the habitat being used may help provide further information for future monitoring, including human uses that may be disturbing any potential nest sites.

Effects Analysis: The primary risk factor from forest management is recreational activities disturbing nesting birds. Differences in projected outputs by alternative for these activities are displayed in Table BE- 22.

Table BE- 22 Acres of management areas by alternative

MgmtArea	Description	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F
3.1A	Swamp Lake SIA	581	581	581	581	581	581

*Direct and Indirect Effects***Alternative A: No action**

No direct or indirect effects on the trumpeter swan are expected from alternative A because the only known location this species has been observed is at Swamp Lake. Swamp Lake is designated a special interest area under the current Forest Plan and provides for management direction to prohibit road construction and limits recreational use of the area to day activities only.

Action Alternatives: Alternatives B-F

No direct or indirect effects on the trumpeter swan are expected from implementation of any of the action alternatives because occurrence of this species is considered incidental to rare and all of the alternatives maintain Swamp Lake as a special interest area, including alternative A

Cumulative Effects

No cumulative effects are expected because of lack of suitable nesting habitat.

Determination

All Plan revision alternatives, including alternative A, are expected to have **No Impact on the trumpeter swan or its primary habitat**. The rationale for this determination follows:

- The trumpeter swan is considered incidental or extremely rare on the Shoshone, with no breeding populations known to occur.

6.7 Riparian (lakes, streams, marshes) amphibians

Boreal western toad (Bufo boreas boreas), Columbia spotted frog (Rana luteiventris), Northern leopard frog (Rana pipiens)

History, Status, and Distribution on the Shoshone

These three species are grouped into one assessment as they all occupy similar habitat and are subject to the same threats. The northern leopard frog has a natural heritage ranking of G5/S3; the Columbia spotted frog is ranked G4/S3; and the boreal western toad is ranked G4/S1. Historical populations, distribution or abundance are unknown for any of these amphibian species that occur on the Shoshone.

Leopard frogs occur through much of North America, excluding the southeastern United States and the far northwestern areas of Alaska and Yukon Territories. They are found throughout most of Wyoming where suitable habitat exists. They are known to occur on the Shoshone based on past surveys. No trend data is available for the Shoshone, but it is suspected that the population is declining in Wyoming (Smith and Keinath 2007).

Spotted frogs only occur in northwestern North America from British Columbia to Utah. In Wyoming and in Region 2, they are known to occur on the Shoshone and the Bighorn National Forests. There are only five known breeding sites on the Shoshone based on surveys from 1993 to 2002. (Patla and Keinath 2005). Known locations on the Shoshone are concentrated in the tributaries of the Upper Wind River and tributaries of the Clarks Fork of the Yellowstone.

The apparent rarity of spotted frogs on much of the Shoshone may relate either to the actual scarcity of this species on the southeastern edge of its range or to low survey effort (Patla and Keinath 2005). No trend data is available for the Shoshone, but trends are being developed for the Greater Yellowstone Ecosystem. While trends have not yet been quantitatively assessed for the Greater Yellowstone Ecosystem, initial assessments indicate that spotted frogs are not experiencing a widespread decline in the ecosystem's national parks, based on the number of new breeding sites found each year and the general persistence of the species in previously identified occupied areas. However, some local declines of spotted frogs have been observed in the Greater Yellowstone Ecosystem (Patla and Keinath 2005).

Boreal western toads range over much of northwestern North America from the southern Yukon to Nevada. In Wyoming, they occur in the western and south-central mountain ranges. Boreal western toads are found throughout the Shoshone; however, no trend data is available. Within the Greater Yellowstone Ecosystem, declines have been reported in both Grand Teton and Yellowstone National Parks (Keinath and McGee 2005).

During amphibian surveys conducted on the Shoshone by the Wyoming Natural Diversity Database (WYNDD) in 2009, spotted frogs were found at 6 of 47 sites and boreal toads were found at 4 sites (and 2 additional unconfirmed boreal toad sites) (Keinath et al. 2009). No leopard frogs were found during surveys.

Habitat Distribution and Condition on the Shoshone

Amphibians are associated with riparian and wetland areas with perennial water, largely at the higher elevations where gradients are gentle in streams and more ponded habitats occur. Outside of the breeding season, boreal toads use a diversity of forested and non-forested habitat.

At the watershed scale, most are in good or excellent condition, with the exception of a subwatershed in Crandall Creek (USFS 2008). Lodgepole Creek was highly impacted by the 1988 Clover Mist Fire and a damaging thunderstorm and flash flood event in 1989. These events resulted in significant changes in upland and stream channel stability. Recovery of this subwatershed will take time.

Riparian habitat is mostly stable and existing protection measures should prevent the loss of any of this habitat type. The conditions of some riparian systems on the Shoshone are outside of their historic ranges of variability due to past impacts from tie hacking, grazing, and water diversions (USFS 2009).

The Shoshone has been improving its management of riparian and wetland areas for the past planning period through improved livestock management efforts in coordination with grazing permittees. Historic levels of livestock grazing were very high in the early 1900s, and have been steadily reduced to bring stocking rates more in line with carrying capacity. Many of the sheep allotments on the Forest have been closed or converted to cattle.

Improvements in road locations and design are also likely to continue across the Shoshone, and this may also reduce recreation impacts to these sites.

Amphibians have persisted on the Shoshone despite high historic levels of grazing that likely reduced vegetative cover along riparian areas, compacted soils, incised streams, and eroded stream banks. These effects varied by stream reach. Reductions in both cattle and particularly sheep livestock grazing from historical levels have likely improved riparian areas.

Risk Factors

Primary risk factors from forest management include: livestock grazing, timber harvest, recreation activities, and travel management within riparian areas. Other risk factors include predation and disease.

Habitat and Population Management Considerations

Amphibian populations have declined worldwide and within Region 2. Maintaining potential habitat for these species is necessary through proper riparian and aquatic habitat management that maintains adequate amounts of vegetative cover, with both herbaceous and woody types being important, along stream courses and in wetland areas.

Any activities, including livestock grazing and logging, should be carefully managed in these areas to maintain adequate cover components, especially near known breeding sites. Loss of vegetative cover directly relates to higher levels of predation and other important physical habitat characteristics, including temperature regulation of ponds and stream courses and water quality issues.

Amphibians may experience high levels of predation if vegetative cover is greatly reduced. Multiple sources of predation are known, including birds, reptiles, mammals, and fish. Predation by non-native trout is a concern.

The occurrence of amphibian disease and mortality events elsewhere in northwestern Wyoming suggests a high likelihood for spotted frog populations of the Shoshone to be affected eventually, if not currently, by the diseases chytridiomycosis and ranavirus (Patla and Keinath 2005).

Roads and culverts have also been known to have an effect on distribution of amphibians by functioning as barriers or a large source of mortality.

Changes in water quality from chemical pollution (insecticides) and increased sedimentation have also been of concern in other areas.

Climate change has the potential to reduce amphibian populations and habitat on the Shoshone. Amphibians have low adaptability potential and narrow environmental tolerance, which make them susceptible to climate change (Rice et al. 2012).

Conservation Measures

In order to provide management for these species to maintain and improve their potential distribution on the Shoshone, the following conservation measures were developed for incorporation into Forest Plan goals, objectives, standards and guidelines. Since there is some viability risk to these species from forest management, it is recognized that inclusion of these measures would alleviate those risks and continue to provide adequate habitat for amphibians.

Conservation measures summarized include:

- 1) Manage livestock and ungulate grazing/browsing so that potential habitat is improved or maintained, particularly during drought years. Retention of vegetative cover at the

wetland edge would be the primary emphasis factor, as well as maintaining the ecological processes that provide for the long-term maintenance of these habitats.

- 2) Maintain and improve known breeding sites.
- 3) Manage dispersed camping and recreational uses such that degradation of riparian areas does not occur and achieve improvements in existing degraded areas.
- 4) Provide forested cover along edges of riparian areas where it naturally exists to maintain temperature control of water.
- 5) Maintain water abundance and associated vegetation at springs and seeps.
- 6) Coordinate with WGFD in assessing the impact of non-native trout on amphibian populations.
- 7) Do not allow for the application of insecticides or herbicides in aquatic habitats, or any other chemical that would threaten water quality or aquatic life, with the exception of pesticides used to restore native aquatic life (e.g., rotenone).
- 8) Locate roads and trails outside of riparian areas to prevent loss of habitat. Use standard water quality conservation practices when conducting activities within riparian areas, including timber harvest or road and trail construction/reconstruction.
- 9) Assess road crossings and prioritize which barriers need to be fixed.
- 10) Do not introduce non-native trout to lakes and rivers known to be of high value to amphibians.

Monitoring Considerations

The most likely beneficial monitoring for amphibians is to ascertain continued existence of populations in known occupied habitat. A continued effort to determine Forest-wide distribution is also needed.

Effects Analysis: Plan revision activities that could potentially influence the boreal toad primarily involve timber harvest, livestock grazing road construction/ reconstruction, motorized/non-motorized recreation, and fuels treatment activities (wildland fire use only). Differences in projected outputs by alternative for these activities are displayed in Table BE- 23.

Table BE- 23 Activities and projected outputs that could potentially influence the boreal toad, Columbia spotted frog and northern leopard frog, by alternative

	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Suitable Timber Base Acres	86,269	127,009	122,103	124,453	179,666	251,205
Vegetation Treatment Acres Mechanical and Mechanical w/Prescribed Fire(Total)	15,470	15,575	14,471	15,062	17,905	21,176
Spruce/fir	1,411	1,415	1,057	1,263	1,547	1,768
Aspen	624	628	529	616	641	664
Vegetation Treatment Acres Prescribed Fire(Total)	23,559	23,302	23,299	23,342	22,823	21,910
Spruce/fir	550	544	495	525	554	566
Aspen	918	909	899	911	878	823
Road Reconstruction Miles-Timber	2	2	2	2	3	4
Wildfire Acres	185,152	182,900	184,132	183,703	174,983	161,363
Livestock Grazing						
Suitable Acres (Total)	375,368	375,368	216,847	375,368	375,368	415,370
Permitted AUMs (Total)	55,881	55,881	31,309	55,881	67,057	70,212
Motorized Recreation-Summer (Acres available)	570,555	570,826	322,381	350,573	656,460	823,907

*Direct and Indirect Effects***Alternative A: No action**

As displayed in Table BE- 23, there are several activities that could potentially influence habitat suitability for the boreal toad, Columbian spotted frog and northern leopard frog. Because wetlands and alpine systems are particularly vulnerable to human impacts and disturbances, it is probable that themes with more active management may offer more risk of impact to these sensitive habitats. Alternative A offers approximately the same amount of acres of active management area as alternatives B, C, and D. Therefore, it is likely that alternative A has a static (maintains existing condition) potential of having negative impacts to the primary habitat

components for the boreal toad. Alternatives E and F exceed alternative A in active management area and acres and may offer the highest risk of potential impacts.

The predicted timber harvest output in primary amphibian habitat (spruce/fir) varies from 1,552 to 2,334 acres and is very minimal in all alternatives. Additional timber harvest in aspen varied from 1,428 to 1,537 acres of harvest during the life of the Plan revision (10 to 15 years). Although impacts could occur if timber sale activities occurred around a currently extant yet unknown population or breeding site, it is unlikely that this would occur due to historic knowledge and continued survey requirements and conservation measures. The overall amount of timber harvest associated with alternative A is also very minimal, thereby reducing the risk that unknown populations could be impacted. Alternative A is therefore expected to have little, if any, influence on potential boreal toad habitat on the Shoshone.

Construction of new roads for timber harvest is very minimal and is estimated to be between 2 to 4 miles across all alternatives. The primary direct effect of roads on amphibians involves the crushing of individuals from vehicle use. Roads can also create barriers to water flow and to the movement of toads across the landscape. Many indirect effects can also occur that influence riparian vegetation and water quality. Potential activities that could influence boreal toad populations and/or habitat include off-road vehicle use, trail construction and use, camping in riparian areas, and activities related to fisheries management such as in-stream channel work, poisoning, and stocking of fish in areas that historically did not support them (Loeffler et al. 2001). Alternatives A and B offer a balanced approach to motorized recreation with less acres affected than alternatives E and F, but more motorized recreation than alternatives C and D. This difference could potentially lessen impacts to high-elevation upland sites that could be considered potential habitat.

Cattle and sheep are grazed at higher elevations and can frequently overlap with potential amphibian habitat. Potential direct effects from grazing can include trampling. Potential indirect effects can include reduced egg and tadpole survival from changes in water chemistry and/or riparian vegetation related to grazing. Alternative A and all action alternatives continue to allocate allotments to livestock grazing. Alternative A maintains the same permitted numbers and area as alternatives B and D—currently set at 55,881 AUMs and 308,900 acres. Some historic domestic sheep allotments have been maintained as vacant because of conflicts with grizzly bears. Alternative A maintains these allotments as vacant.

Prescribed fire activities most likely do not overlap in elevation with boreal toad habitat on the Shoshone. However, wildland fire use will be utilized as a tool to allow natural disturbances to occur within high-elevation spruce/fir zones as opportunities arise. It is estimated that all alternatives may allow from 161,363 to 185,152 acres of wildland fire use. Depending upon fire severity and scale, these outputs could have negative or positive influences on amphibians. Primary influences of fire in amphibian habitat involves the burning of small diameter (7 to 10 inches) ground fuels and slash piles that toads may use as refugia sites. Positive influences can occur if fire stimulates the growth of the shrub component used in upland sites (Loeffler et al. 2001). Potential positive or negative influences cannot be predicted at this time because wildland fire use is not a planned output.

Action Alternatives: Alternatives B-F

As displayed in Table BE- 23, the projected timber harvest output in spruce/fir and aspen forest in alternatives B, C, D, E, and F varies from about 2,976 acres (alternative C) to 3,847 acres (alternative F). Overall, little effects difference exists among all of the alternatives because all of

the outputs represent a minimal amount of the forest cover types involved, and potential impacts would only be possible around waterbodies. Construction of new roads for timber harvest that would remain open to public use is very minimal for all alternatives; estimated between 2 to 4 miles. Effects may be associated with these activities but are expected to be minor because of best management practices in riparian habitat and the large amount of unroaded area that remains undeveloped. As is consistent with the active management theme, alternative F also offers the greatest amount of projected timber output and greatest amount of area where this activity may occur. However, all alternatives influence less than 0.01 percent of the cover type and are expected to have no minimal effects on amphibian habitat.

Alternative B offers the same amount of disturbance from summer motorized use as alternative A. The effects from these two alternatives maintain suitable amphibian habitat at the existing condition. Alternatives C and D offer fewer potential disturbances than no action from summer motorized recreation because of the decrease in the amount of permitted motorized use area. Consistent with their themes, alternatives E and F offer the largest motorized acres, with alternative F offering the highest amount of acreage of the two alternatives. This difference could potentially allow greater impacts to high-elevation upland sites that could be considered potential habitat.

As displayed in Table BE- 23, alternative B maintains the same permitted numbers and area for livestock grazing as alternative D, currently set at 55,881 AUMs and 374,724 acres, and potential effects would be similar to alternative A. Alternative C reduces livestock numbers and allotment area to 31,309 AUMs and 322,381 acres. This alternative may reduce the amount of potential habitat influenced, but is not expected to have any measurable difference in regard to protection of habitat for the boreal toad. Alternatives E and F allow more livestock grazing than the other alternatives, and increases livestock numbers and allotment area to 67,057 AUMs and 374,724 acres and 70,212 AUMs and 414,726 acres, respectively. Current vacant sheep allotments could be filled under alternative E. Alternative F would require more management attention to assure that livestock do not damage potential amphibian habitat.

As with no action, it is estimated that wildland fire use may be used as a management tool on 161,363 to 185,152 acres in all action alternatives. The amount of area potentially used for wildland fire use is not dependent upon which alternative is selected, and no differences are expected.

Cumulative Effects

Cumulative effects over and above the direct and indirect effects mentioned above are minimal on the Shoshone due to the limited amount of private land within the Forest boundary. There are no known proposals for additional development of any of these lands. Lands adjacent to the Shoshone are primarily private and/or BLM. Private lands receive minimal pressure from urban development trends. These adjacent lands would likely continue to receive impacts from livestock grazing and water depletions that are ongoing. These activities should not impact habitat on the Forest, but may increase the value of riparian habitat. Individual species protections would be ensured through preparation of site-specific NEPA analysis and biological evaluations, with protection offered through Forest-wide standards and guidelines.

Determination

All Plan revision alternatives, including alternative A, **“may adversely impact individuals (boreal toads), but would not likely result in a loss of viability on the Planning Area, nor**

cause a trend to federal listing or a loss of species viability rangewide.” The rationale for this determination follows:

- There is uncertainty about some recreational uses and expanded road network and potential ground disturbances in riparian habitat.
- Riparian and wetland habitat used by amphibians is in good or excellent condition
- All alternatives are associated with activities and outputs that may have potential influences on occupied habitat.
- Water management activities are managed to reduce impacts on aquatic species; however, reduced water flows have direct and indirect influences on prey species and habitat conditions.

6.8 Caves and mines mammals

Fringed myotis (*Myotis thysanodes pahasapensis*), *Spotted bat* (*Euderma maculatum*), *Townsend's big-eared bat* (*Corynorhinus townsendii*)

History, Status, and Distribution on the Shoshone

Fringed myotis, spotted bat, and Townsend's big-eared bat were combined into one species viability assessment due to similar habitats and similar risks. Globally all three species are G4. At the State level, fringed myotis and Townsend's big-eared bat are S2, and the spotted bat is S3. Historical populations, distribution, or abundance are unknown on the Shoshone. Also, no current trend data is available that is specific to the Shoshone or Wyoming for any of these bat species.

The fringed myotis ranges across the Pacific Northwest and central Rocky Mountains south to Mexico (Keinath 2004). Wyoming is within their current range. The Wyoming Game and Fish Department (WGFD) surveyed for bats in northwestern Wyoming in 2009 and detected fringed myotis on the Shoshone, based on acoustic calls and mist netting (WGFD 2010).

Currently, the spotted bat is known to occur across large areas of western North America from southern British Columbia to Mexico (Luce and Keinath 2007). Its distribution in Wyoming is still unknown, but the spotted bat is expected to occur statewide in suitable habitat (Hester and Grenier 2005). The WGFD surveyed for bats in northwestern Wyoming in 2009 and detected spotted bats at one location on the Shoshone, based on acoustic calls (WGFD 2010).

Townsend's big-eared bats are widely distributed in western North America. They occur from southern British Columbia south to Mexico and east to South Dakota and Kansas with disjunct populations in the eastern United States (Gruver and Keinath 2006). Townsend's are a year-round resident throughout most of Wyoming, but are primarily found in the north-central and southeastern parts of the state (Hester and Grenier 2005). During the 2009 WGFD bat survey T northwestern Wyoming. Townsend's big-eared bats were detected at multiple locations on the Shoshone, based on acoustic calls (WGFD 2010).

Habitat Distribution and Condition on the Shoshone

These three bats use a variety of habitats (Table BE- 24). Townsend's big-eared bats and fringed myotis use caves and abandoned mines for roosting and hibernacula, with spotted bats possibly using them for hibernacula.

Table BE- 24 Habitat for fringed myotis, spotted bats, and Townsend's big-eared bats (Hester and Grenier 2005)

Species	Foraging	Summer Roost	Hibernacula
Fringed myotis	Dry conifer forest	Buildings, caves, rock crevices	Caves and mines
Spotted bat	Canyons, riparian, forest edge	Cliffs	Possibly caves and mines, may migrate south or to lower elevations
Townsend's big-eared bat	Forest edge, riparian	Caves, Mines, Buildings	Caves and mines

Forested foraging habitat is abundant on the Shoshone. There are about 309,442 acres of spruce/fir, 345,273 acres of Douglas-fir, 382,886 acres of lodgepole pine, 190,609 acres of whitebark pine, and 35,251 of limber pine on the Shoshone (USFS 2012b). Shrubland foraging habitat is limited on the Forest. There are about 76,060 acres of willow, sagebrush, and aspen (USFS 2012b). Some evidence suggests that lodgepole pine has become less abundant in the last century, while spruce/fir has increased (USFS 2012a). Fire suppression reinforces this trend, but increases in wildfire and insect outbreaks may begin to reverse this trend.

Forest inventory data indicates that about 30 percent of the spruce/fir is mature (over 200 years old); about 22 percent of the lodgepole pine is mature (over 150 years old); about 16 percent of the Douglas-fir is mature (over 200 years old); about 23 percent of the whitebark pine is mature (over 200 years old); and about 28 percent of the limber pine is mature (over 200 years old) (USFS 2009). Data on current aspen age classes are inconclusive.

In recent years, the Shoshone has experienced large wildfires and insect epidemics. About 115,000 acres have burned in the last 5 years and about 161,500 acres in the last 10 years (USFS 2012a).

Over the past 11 years, widespread bark beetle epidemics have occurred on the Shoshone.

Insect outbreaks and wildfires are likely altering foraging habitat to some degree for these bats on the Shoshone. Climate change increases the potential for more and continued insect outbreaks and also increases the frequency of fires (Rice et al. 2012).

Caves and abandoned mines are rare on the Shoshone. Currently, there is very little human use of caves and abandoned mines on the Forest. Suitable cliff habitat for spotted bats is also a rare feature on the Shoshone. Based on distribution modeling, the highest probability of occurrence for spotted bats is the very northeastern edge of the Forest (Keinath et al. 2010).

Risk Factors

The primary risk factors from forest management are recreational use of caves and abandoned mines and vegetation treatments in shrubland and aspen habitat. A potential major risk factor associated with bats using caves and mines for hibernacula is white-nose syndrome.

Habitat and Population Management Considerations

The most important forest management emphasis for the conservation of bats on the Shoshone is protection of caves and abandoned mines from human use. This will reduce the potential risk of spreading white-nose syndrome. Vegetation management projects should focus on restoration of aspen stands and reduction of conifer encroachment into the stands.

Conservation Measures

In order to provide management for these species and to maintain or improve their potential distribution on the Shoshone, the following conservation measures were developed for incorporation into Forest Plan goals, objectives, standards and guidelines. Given the abundance of foraging habitat and recommended protection of caves and abandoned mines on the Shoshone, current viability risk from forest management to these bat species is low. If white-nose syndrome occurs in the region in the future, the viability risk will increase.

Conservation measures summarized include:

- 1) Limit human disturbance, and where necessary, close caves and abandoned mines to human use that have documented bat populations.
- 2) When closing mines or caves, minimize disturbance and effects to microclimate, and provide access for bats.
- 3) Manage aspen, willow, and sagebrush cover types to reduce or halt the decline of acres due to conifer encroachment.

Monitoring Considerations

Important monitoring considerations for these bats would be to cooperate with the WGFD to continue to survey for bats and determine their distribution on the Shoshone. An inventory of known hibernacula and summer cave and abandoned mine roosting sites would be important.

Effects Analysis: Plan revision activities that could potentially influence the fringed myotis, spotted bat and Townsend's big-eared bat include abandoned mine closures and, possibly fuels treatment and timber management activities. Influences from fuels and timber treatments would be limited to the lower-elevation habitat types where the fringed myotis may potentially occur. Differences in projected outputs by alternative for these activities are displayed in Table BE- 25.

Table BE- 25 Activities and projected outputs that could potentially influence the fringed myotis, spotted bat and Townsend's big-eared bat, by alternative

	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Suitable Timber Base Acres	86,269	127,009	122,103	124,453	179,666	251,205
Vegetation Treatment Acres Mechanical and Mechanical w/Prescribed Fire (Total)	15,470	15,575	14,471	15,062	17,905	21,176
Douglas-fir	2,924	2,937	2,336	2,632	3,181	4,250
Lodgepole pine	5,291	5,319	5,641	5,361	7,058	9,211
Aspen	624	628	529	616	641	664
Vegetation Treatment Acres Prescribed Fire(Total)	23,559	23,302	23,299	23,342	22,823	21,910
Douglas-fir	4,949	4,869	4,836	4,871	4,748	4,585
Lodgepole pine	1,974	1,969	2,021	1,977	2,191	2,449
Aspen	918	909	899	911	878	823
Install Structures to Maintain Bat Habitat on Mine Closures	As Opportunities Arise	Same as Alt. A	Same as Alt. A	Same as Alt. A	Same as Alt. A	Same as Alt. A

*Direct and Indirect Effects***Alternative A: No action**

Alternative A offers similar timber management treatments as alternatives B, C, and D in dry forest types that may support fringed myotis, spotted bat, and Townsend's big-eared bat. Because the fringed myotis is known to day roost in both conifer and aspen snags, potential impacts to the species could occur if the planned activities result in reductions in these components. This potential affect would be similar across most alternatives with the potential of the greatest effects in alternative F, as it proposes the most amount of vegetation treatment. Conversely, restoration activities that include thinning of small dense trees might benefit the foraging patterns of many bat species. Several Plan components also focus on snag management and retention, and although impacts will occur, they are anticipated to be minor.

Alternative A offers similar prescribed fire treatments as alternatives B-F in the dry forest types that offer potential habitat for the fringed myotis, spotted bat, and Townsend's big-eared bat. Impacts to potential roost sites or individual bats could occur in these locations if snags are fire-hardened, removed, or burned.

Alternative A provides the same wildlife management actions in regard to mine closures with bat gates as opportunities arise. Thus, all alternatives install the same quantity and quality of mine closure bat gates over the life of the Plan. This action could be quite beneficial to the fringed myotis, spotted bat, and Townsend's big-eared bat because they readily roost in abandoned mines.

Action Alternatives: Alternatives B-F

As displayed in Table BE- 25.

In general, alternatives E and F offer a higher risk of negative influences on some potential habitat components for the fringed myotis, spotted bat, and Townsend's big-eared bat, such as snags, because they both allocate a greater amount of area to active vegetation management scenarios. However, potential impacts are expected to be minimal because abandoned mines and cave habitat represent one of the most significant landscape features for this species and all alternatives include active wildlife management goals that target important underground roost sites for closure and protection. Plan components are also expected to reduce impacts to snags and other vegetation where active management occurs. Alternatives B-D offer similar timber management treatments in dry forest types as the no action therefore the effects are similar to those in alternative A.

The protection of abandoned mines with bat gates could be the single-most important Plan output in regards to conservation of the fringed myotis because it frequently utilizes mines and caves for reproductive habitat. The fringed myotis spotted bat and Townsend's big-eared bat is also very sensitive to disturbances within these habitats. There is no difference among the Plan revision alternatives in regard to implementation of wildlife management activities that may provide bat gates on abandoned mines used by bat species. The same potential benefits are associated with each action alternative.

Cumulative Effects

Cumulative effects are minimal on the Shoshone due to the limited amount of private land within the Forest boundary, and minimal if any development of National Forest System land anticipated in the future. There are no known proposals for additional development of any of these lands. Lands adjacent to the Shoshone are primarily private and/or BLM. Many cave resources occur adjacent to the Forest, some on private, and some on BLM. Recreational use of caves on the Shoshone is currently unknown, indicating a need for monitoring these habitats, and implementing protection measures if necessary. Some of the caves adjacent to the Forest have received bat-friendly closure gates to mitigate human recreation impact. The most significant cumulative impact to rock outcrops, cave habitats, and species on the Forest would continue to be from non-native species and/or recreation-related disturbances. Both potential impacts may increase over time.

Determination

All Plan revision alternatives, including alternative A, **“may adversely impact individuals (fringed myotis, spotted bat, and Townsend's big-eared bat), but would not likely result in a loss of viability on the Planning Area, nor cause a trend to federal listing or a loss of species viability rangewide.”** The rationale for this determination follows:

- The single-most important habitat element for the fringed myotis, spotted bat, and Townsend's big-eared bat on the Shoshone is most likely suitable mines and caves that provide reproductive habitat. Protection of these features is similarly associated with all alternatives.

- All potential impacts cannot be completely discounted because some Plan activities may occasionally remove potential snag and tree roosts utilized by the species.
- Information on use of caves and mines by bats is limited on the Shoshone.

6.9 Cliff birds

American peregrine falcon (Falco peregrinus anatum)

History, Status, and Distribution on the Shoshone

The American peregrine falcon has a natural heritage ranking of G4/S2. Historical populations, distribution, or abundance are unknown on the Shoshone. The peregrine falcon was removed from the Endangered Species list in 1999.

Peregrine falcons are known to breed worldwide. Historically, peregrine falcons bred throughout North America. They were extirpated from much of their range due primarily to DDT (dichlorodiphenyltrichloroethane). Through reintroduction and recovery efforts peregrine falcons have re-populated much of their former range. They are found scattered throughout most of Wyoming, but breed primarily in the western half of the state (WGFD 2010). Peregrines are considered a rare resident species in Wyoming. They are known to breed on the Shoshone.

The WGFD annually monitors peregrine eyries with the number of known eyries in the State steadily increasing since 1998 (WGFD 2010). This data includes eyries on the Shoshone. In 2009, more than 90 pairs of falcons nested in Wyoming. Trend data is also available for Yellowstone National Park, which is adjacent to the Shoshone. The number of nesting pairs has steadily increased in the park since about 1990 (Figure BE- 10). No trend data is available that is specific to the Shoshone, but the trend is also likely increasing.

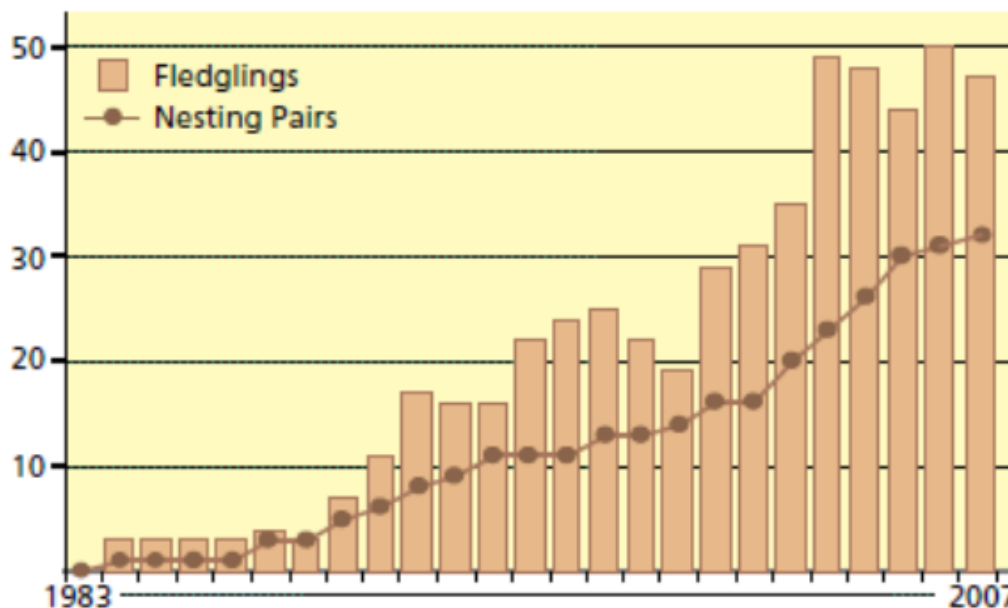


Figure BE- 10 Total counted peregrine falcon nesting pairs and fledglings in Yellowstone National Park, 1984–2007 (YNP 2010)

Habitat Distribution and Condition on the Shoshone

Peregrines nest on cliffs which are often located near water and are usually close to habitat with abundant prey (WGFD 2010). They forage in a variety of open habitats from open woodlands and forests to shrub-steppe, grasslands, marshes, and riparian habitats. Due to specific cliff-nesting habitat requirements, nesting habitat for peregrine falcons is inherently limited on the Shoshone. The Clarks Fork of the Yellowstone River canyon likely provides some of the best habitat on the Forest based on past observations (WYNDD 2010).

Due to the typical inaccessibility to cliffs, forest management activities have had little effect on potential peregrine falcon nesting habitat. Of the various forest management activities, ice climbing could have the great potential of affecting suitable habitat for this species, but this needs to be further investigated.

Management Emphasis Species Consideration

Peregrine falcons will be retained as a Region 2 sensitive species on the Shoshone through Forest Plan revision.

Risk Factors

The primary risk factor from forest management would be recreational activities that disturb eyries. Other factors would include falconry.

Habitat and Population Management Considerations

Maintaining undisturbed habitat near eyries would be the most important forest management emphasis for peregrine falcon habitat. Human disturbance near eyries has been known to cause site abandonment (White et al. 2002).

Conservation Measures

In order to provide management for peregrine falcons and to maintain or improve its potential distribution on the Shoshone, the following conservation measures were developed for incorporation into Forest Plan goals, objectives, standards and guidelines. Given the typical inaccessibility to peregrine falcon eyries on the Forest and by protecting known eyries, overall viability risk from forest management to peregrine falcons is low.

Conservation measures summarized include:

- 1) If an active eyrie is located, avoid project activities and human disturbance within 0.5 mile of the eyrie from February 1 to August 1.

Monitoring Considerations

Important monitoring considerations for peregrine falcons would be to continue to cooperate with the WGFD to continue the monitoring of known eyries to determine territory occupancy, nest success, and productivity.

Effects Analysis. Plan revision activities that could potentially influence the peregrine falcon primarily involve motorized and non-motorized recreation (i.e., rock climbing). Riparian management activities could potentially improve prey habitat for the falcon. Differences in projected outputs by alternative for these activities are displayed in Table BE- 26.

Table BE- 26 Activities and projected outputs that could potentially influence the peregrine falcon, by alternative

	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Motorized Recreation-Summer (Acres available)	570,555	570,826	322,381	350,573	656,460	823,907
Riparian and Watershed Improvements	No Acres Available	No Acres Available	No Acres Available	No Acres Available	No Acres Available	No Acres Available

*Direct and Indirect Effects***Alternative A: No action**

Existing conditions have recovered the peregrine falcon to the point that it has been delisted from the Endangered Species Act. Alternatives A and B are expected to continue this trend because most nest sites are inaccessible to human impacts. However, it is possible that alternative A provides a higher risk of disturbance to individuals than alternative C and D because there is more “suitable opportunity” land for motorized travel. Both alternatives E and F increase the amount of motorized travel and human activity over alternative A, therefore, they could potentially disturb peregrine falcons while they are nesting.

Rock and ice climbing activities also have the potential to disturb falcons if the activity occurs near nest sites. Although both rock and ice climbing are popular sports on the Shoshone, there is no evidence to suggest that it is currently influencing nest productivity or causing disturbances.

The amount of riparian improvement by alternatives is not known at this time. This activity may benefit prey species if it occurs in areas where falcons forage.

Action Alternatives: Alternatives B-F

Alternatives C and D are the only action alternatives that have the potential to reduce impacts from motorized travel in a similar manner, with most road access restricted to current routes and trails. Although travel impacts to individual falcons may still occur, it is likely that these travel management actions will reduce potential disturbances to nesting falcons. Both alternatives E and F increase the amount of motorized travel and human activity over the other alternatives, therefore, they could potentially disturb peregrine falcons the most while they are nesting.

Potential influences from rock and ice climbing are not expected to be different under the action alternatives. Site-specific management and protection of nest sites will occur.

Cumulative Effects

Cumulative effects are minimal on the Shoshone due to the limited amount of private land within the Forest boundary, and minimal if any development of Forest Service land anticipated in the future. There are no known proposals for additional development of any of these lands. Lands adjacent to the Forest are primarily private and/or BLM. Cliff resources, while limited, occur adjacent to the Forest, some on private, and some on BLM. Recreational use of cliffs on the Shoshone is currently limited, indicating a need for monitoring these habitats, and implementing protection measures if necessary.

Determination

All Plan revision alternatives, including Alternative A, “**may adversely impact individuals (peregrine falcons), but would not likely result in a loss of viability on the Planning Area, nor cause a trend to federal listing or a loss of species viability rangewide.**” The rationale for this determination follows:

- Persistent populations of the peregrine falcon occur on the Shoshone and the species has been declared recovered throughout the contiguous United States.
- Minimal influences from human disturbances are expected because of nest site inaccessibility.
- All potential impacts to individuals cannot be completely discounted because of some planned activities such as motorized travel, rock and ice climbing, and other recreational pursuits.

7.0 Literature Cited – References